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CHECK-LIST AND KEYS TO THE FAMILIES AND SUBFAMILIES OF THE HEMIPTERA-HETEROPTERA

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W. E. CHINA & N. C. E. MILLER

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CHECK-LIST AND KEYS TO THE FAMILIES AND SUBFAMILIES OF THE HEMIPTERA-HETEROPTERA

By W. E. CHINA & N. C. E. MILLER

In 1955 (*Ann. Mag. nat. Hist.* (12) **8** : 257–267) the present authors published a tentative check-list of family and subfamily names in Heteroptera.

A number of omissions of synonyms and a few errors were brought to our notice in correspondence. Indeed the whole object of publishing that tentative list was to solicit such criticism and suggestions. A position has now been reached where the publication of a new list is advisable.

We have considered a list of emendations and additions but such a list would be hard to use and would need continual reference to the original publication.

A new list is therefore given in full, and to make it more useful to students a Key to the families and subfamilies, based only on external characters, is appended.

Again, the arrangement has no phylogenetical significance. For this, students should refer to Fig. 1. which indicates the relationships of the families based on recent research.

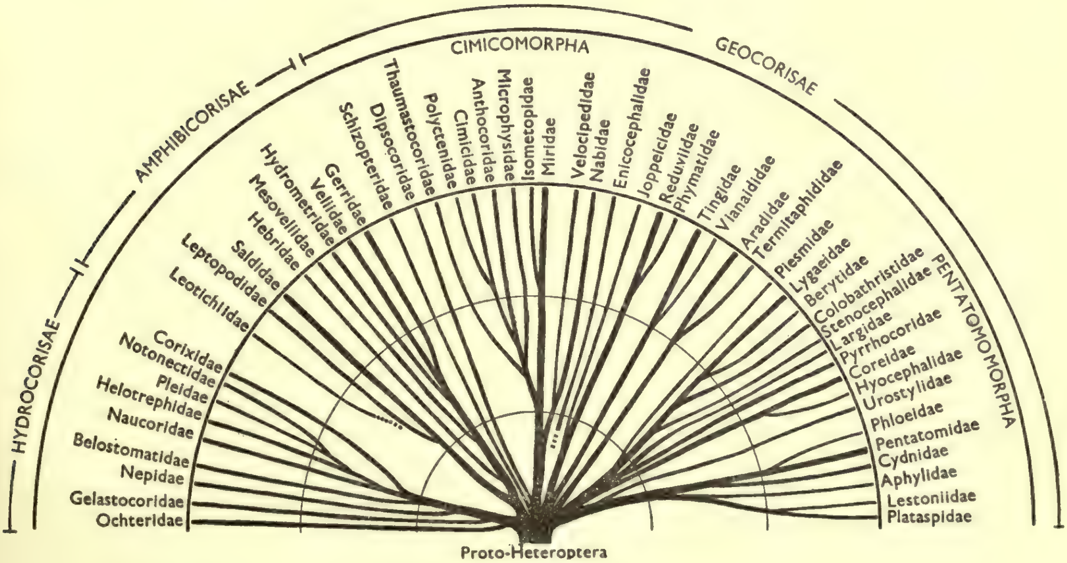
HYDROCORISAE
AMPHIBICORISAE
CIMICOMORPHA
GEOCORISAE
PENTATOMOMORPHA
Ochteridae
Gelastocoridae
Nepidae
Belostomatidae
Naucoridae
Helotrephidae
Pleidae
Notonectidae
Corixidae
Leotichiidae
Leptopodidae
Saldidae
Hebridae
Mesoveliidae
Hydrometridae
Veliidae
Gerridae
Schizopteridae
Dipsocoridae
Thaumastocoridae
Polyctenidae
Cimicidae
Anthocoridae
Microphysidae
Isometopidae
Miridae
Velocipedidae
Nabidae
Enicocephalidae
Joppeicidae
Reduviidae
Phymatidae
Tingidae
Vianaididae
Aradidae
Termitaphididae
Piesmidae
Lygaeidae
Berytidae
Colobathristidae
Stenocephalidae
Largidae
Pyrrhocoridae
Coreidae
Hyocephalidae
Urostylidae
Phloeidae
Pentatomidae
Cydnidae
Aphylidae
Lestoniidae
Plataspidae
Proto-Heteroptera

Fig. 1

In the present list we have decided to accept the Amyot & Serville, 1843 names as valid, but, in case they are later invalidated, we give the next oldest valid name.

Contrary to current usage, we believe that the Heteroptera represent merely a suborder and, together with the suborder Homoptera, comprise the Order Hemiptera. It is preferable not to regard the Heteroptera as the typical suborder and to replace the name Heteroptera by Hemiptera. We believe that such procedure, usually applied to subfamilies and tribes, is not appropriate to the highest categories where it would prove confusing.

The existence between the Heteroptera and Homoptera of such connecting links as the Peloridiidae, combined with the very uniform mouth parts and metamorphosis within the Order, indicate that these two groups are best regarded as suborders of the comprehensive Hemiptera.

The innumerable group-names of Lethierry & Severin, 1893–94 and of Haglund, 1895 have not been included, since they are mainly tribal.

Order HEMIPTERA

Suborder *HETEROPTERA*

Family	***Plataspidae*** Dallas, 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 61.
Synonym	Arthropteridae Fieber, 1860, *Europ. Hemipt.*, p. 27.
Synonym	Coptosominae Kirkaldy, 1909, *Cat. Hemipt.* 1. Cimicidae, p. 36.
Synonym	Coptosomatidae Reuter, 1912, *Öfv. Finska Vet. Soc. Förh.* **54A**, No. 6 : 45.
Synonym	Brachyplatidae Leston, 1952, *Ann. Mag. nat. Hist.* (12), **5** : 512.
Family	***Lestoniidae*** (China), 1955, *Ann. Mag. nat. Hist.* (12), **8** : 210 (Lestoniinae).
Family	***Cydnidae*** (Billberg), 1820, *Enum. Ins. Billb.*, p. 70 (Cydnides).
Subfamily 1.	Thyreocorinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xviii, 60 (Thyreocorides).
Synonym	Corimelaeninae Uhler, 1872, *Report U.S. Geol. Survey* (1871), **4** : 471.
Synonym	Thyreocorinae Van Duzee, 1907, *Bull. Buffalo Soc. nat. Sci.* **8**, pt. 5 : 5.
Subfamily 2.	Cydninae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xx, 87 (Cydnides).
Synonym	Cydninae Dallas, 1851, [1]*Cat. Hemipt. Brit. Mus.* 1, p. 109 (*partim*).
Subfamily 3.	Sehirinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxi, 96 (Sehirides). Sehirinae (Stål), 1864, *Hemipt. Afric.* 1, p. 18. (Sehirida).
Synonym	Cydninae Dallas, 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 109 (*partim*).
Family	***Pentatomidae*** (Leach), 1815, *Brewster's Edinb. Encyc.* **9** : 121 (Pentatomides).

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[1] This work has been consistently wrongly referred to as " List Hem. B.M."

Synonym	Cimicidae Kirkaldy, 1909, *Cat. Hemipt.* 1, p. 1.
Subfamily 1.	Asopinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xix, 77 (Asopides).
Synonym	Asopinae (Spinola), 1850, *Tav. Sin. Hem.* ex *Mem. Math. Fis. Soc. Ital. Sci. Modena*, **25**, 1 : 69 (1852) (Asopoideae).
Synonym	Amyotinae Schouteden, 1906, *Wytsman. Gen. Ins.* **52** : 2.
Synonym	Amyotinae Leston, 1953, *Ent. Gaz.* **4** : 19.
Synonym	Arminae Bergroth, 1908, *Mem. Soc. ent. belg.* **15** : 180.
Synonym	Tahitocorinae (Yang), 1935 *Ann. Mag. nat. Hist.* (10), **16** : 480 (Tahitocoridae).
Subfamily 2.	Tessaratominae[1] (Stål), 1865, *Hemipt. Afric.* 1, p. 33 (Tessaratomida).
Subfamily 3.	Eumenotinae Esaki, 1922. *Ins. Insc. Mens.* **10** : 196 (under Aradidae); 1930, *Ann. Mag. nat. Hist.* (10) **5** : 630 (under Pentatomidae).
Subfamily 4.	Cyrtocorinae Distant, 1880, *Biol. centr. Amer. Rhynchota, Het.* 1, p. 43.
Subfamily 5.	Dinidorinae (Stål), 1870, *Enum. Hemipt.*, p. 79.
Subfamily 6.	Phyllocephalinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxix, 174 (Phyllocephalides).
Synonym	Phyllocephalinae (Dallas), 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 350 (Phyllocephalidae).
Subfamily 7.	Pentatominae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxiv, 124 (Pentatomides).
Synonym	Pentatominae Stål, 1864, *Hemipt. Afric.* 1, pp. 32, 76.
Synonym	Halydidae Dallas, 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 150.
Synonym	Sciocoridae Dallas, 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 130.
Synonym	Sciocorides Amyot & Serville, 1843, *Hist. nat. Hémipt.*, p. 118.
Synonym	Macropeltidae Fieber, 1860, *Europ. Hemipt.*, pp. 26, 327.
Synonym	Discocephalidae Fieber, 1860, *Europ. Hemipt.*, pp. 26, 326.
Synonym	Aeliidae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 14.
Synonym	Rhaphigastridae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxv, 141 (Rhaphigastrides).
Subfamily 8.	Scutellerinae (Leach), 1815, *Brewster's Edinb. Encyc.* **9** : 121 (Scutellerida).
Synonym	Pachycorinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xvi, 34 (Pachycorides).
Synonym	Tetyrinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xvii, 45 (Tetyrides).
Synonym	Eurygastrinae Amyot & Serville, 1843, *Hist. nat. Hémipt.*, pp. xviii, 51 (Eurygastrides).
Synonym	Odontoscelidae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 13.
Synonym	Eurygastridae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 13.

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[1] See China, 1954, *Ent. Mon. Mag.* **90** : 128 for Tessaratomides Schilling, 1829. Edessides Amyot & Serville, 1843, pp. xxvii, 155 and of Dallas, 1851 and Dohrn, 1859 cover Pentatominae as well as Tessaratominae.

Subfamily 9.	Podopinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xviii, 56 (Podopides).
Synonym	Oxynotidae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xviii, 58 (Oxynotides).
Synonym	Graphosomatinae Jakowleff, 1884, *Hor. Soc. ent. Ross.* **18** : 204.
Subfamily 10.	Serbaninae Leston, 1953, *Rev. Brasil Biol.*, **13** : 137.
Subfamily 11.	Acanthosomatinae (Stål), 1864, *Hemipt. Afric.* 1, pp. 33, 219 (Acanthosomida).
	(Leston, 1953, *Ent. Gazette* **4** : 20 elevates this group to family rank. We have decided that it is better to regard it as a subfamily as has been done with such families as Aepophilidae and Aphelocheiridae.)
Subfamily 12.	Canopinae[1] (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xix, 70 (Canopides).
Synonym	Canopinae Horvath, 1919, *Ann. Mus. nat. Hung.* **17** : 205.
Subfamily 13.	Megaridinae[1] McAtee & Malloch, 1928, *Proc. U.S. nat. Mus.* **72** : 1.
Family	***Aphylidae*** (Bergroth), 1906, *Zool. Anz.* **29** : 646 (Aphylinae).
Synonym	Aphylidae Reuter, 1912, *Öfv. Finska Vet. Soc. Förh.* **54A**, No. 6 : 46.
Family	***Urostylidae*** Dallas, 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 313.
Synonym	Urolabidae (Stål), 1876, *Svensk. Vet. Ak. Handl.* **14** : 4 : 115 (Urolabida).
Synonym	Urolabididae Reuter, 1912, *Öfv. Finska Vet. Soc. Förh.* **54**, No. 6 : 37.
Subfamily 1.	Urostylinae Dallas, 1851, *Cat. Hemipt. Brit. Mus.* 1, p. 313.
Subfamily 2.	Saileriolinae China & Slater, 1956, *Pacific Sci.* **10** : 412.
Family	***Phloeidae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxiv, 115 (Phloeides).
Synonym	Phloeidae Dallas, 1851, *Cat. Hémipt. Brit. Mus.* 1, p. 149.
Family	***Coreidae*** Leach, 1815, *Brewster's Edinb. Encyc.* **9** : 121.
Synonym	Lygaeidae Kirkaldy, 1899, *Entomologist*, **32** : 220.
Subfamily 1.	Meropachydinae Stål, 1867, *Öfv. Vet. Ak. Förh.* **24** : 535–536 (Meropachydida).
Synonym	Merocorinae (Stål), 1870, *Enum. Hemipt.* 1, p. 125 (Merocorina).
Subfamily 2.	Coreinae (Stål), 1867, *Öfv. Vet-Ak. Förh.* **24** : 535–543 (Coreida).
Synonym	Centroscelinae Kirkaldy, 1899, *Entomologist*, **32** : 220.
Synonym	Anisoscelidae Dallas, 1852, *Cat. Hemipt. Brit. Mus.*, p. 449.
Subfamily 3.	Pseudophloeinae (Stål), 1867, *Öfv. Vet.-Ak. Förh.* **24** : 535 (Pseudophloeida).
Synonym	Arenocorinae Bergroth, 1913, *Mem. Soc. ent. belg.* **22** : 135.
Subfamily 4.	Agriopocorinae Miller, 1953, *Proc. Linn. Soc. N.S. Wales*, **78**, pts. 5 and 6 : 233.
Subfamily 5.	Rhopalinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxiii, 243 (Rhopalides).
Synonym	Rhopalidae Dallas, 1852, *Cat. Hemipt. Brit. Mus.*, p. 520.

[1] These two subfamilies have been previously referred to the Plataspidae (McAtee & Malloch, 1928, Proc. U.S. nat. Mus. **72** : 1) and to the Cydnidae (China & Miller, 1955).

Synonym	Corizidae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 17.
Synonym	Chorosomidae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 17.
Synonym	Corizinae Mayr, 1866, *Reise Freg. Novara, Zool. Hémipt.*: **2** : 121.
Subfamily 6.	Alydinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxiv, 221 (Alydides).
Synonym	Alydinae (Dallas), 1852, *Cat. Hemipt. Brit. Mus.* **2** : 467 (Alydidae).
Synonym	Coriscidae Stichel, 1925, *Illus. Bestimmungstabellen Deutsch. Wanz.*, p. 45.
Family	***Stenocephalidae*** Dallas, 1852, *Cat. Hemipt. Brit. Mus.* **2** : 480.
Synonym	Dicranocephalidae (Scudder), 1957, *Proc. R. Ent. Soc. London* (A)**32** : 147 (Dicranocephalini).
Family	***Hyocephalidae*** Bergroth, 1906, *Zool. Anz.* **29** : 649.
Family	***Lygaeidae*** (Schilling), 1829, *Beitr. z. Ent.* **1** : 37. (Lygaeides).
Synonym	Myodochidae Kirkaldy, 1899, *Entomologist*, **32** : 220.
Synonym	Geocoridae Kirkaldy, 1902, *Journ. Bombay Nat. Hist. Soc.* **14** : 306.
Synonym	Pyrrhocoridae Kirkaldy, 1904, *Entomologist*, **37** : 280.
Subfamily 1.	Megalonotinae Slater, 1957, *Bull. Brooklyn ent. Soc.* **52**, 2 : 35.
Synonym	Rhyparochrominae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxvi, 251 (Rhyparochromides). (Based on *Rhyparochromus* Curtis 1836 : type *Lygaeus chiragra* Fabr. 1794. = *Megalonotus* Fieber, 1860.
Synonym	Rhyparochrominae (Stål), 1862, *Öfv. Vet.-Ak. Förh.* **19** : 210 (Rhyparochromida). Based on *Rhyparochromus* Hahn 1826 : type *Cimex pini* L., 1758.
Subfamily 2.	Geocorinae (Stål), 1862, *Öfv. Vet.-Ak. Förh.* **19** : 212 (Geocorida).
Subfamily 3.	Blissinae (Stål), 1862, *Öfv. Vet-Ak. Förh.* **19** : 210 (Blissida).
Subfamily 4.	Cyminae (Stål), 1862, *Öfv. Vet.-Ak. Förh.* **19** : 210 (Cymida).
Subfamily 5.	Lygaeinae (Stål), 1862, *Öfv. Vet-Ak. Förh.* **19** : 210 (Lygaeida).
Synonym	Astacopinae Kirkaldy (*partim*), 1907, *Canadian Ent.* **39** : 244.
Subfamily 6.	Oxycareninae (Stål), 1862, *Öfv. Vet.-Ak. Förh.* **19** : 212 (Oxycarenida).
Synonym	Anemopharina Berg, 1879, *Hem. Argent.*, p. 285.
Subfamily 7.	Pamphantinae Barber & Bruner, 1933, *Journ. N.Y. Ent. Soc.* **41** : 532.
Subfamily 8.	Malcinae (Stål), 1866, *Hemipt. Afric.* 2, p. 121 (Malcida).
Subfamily 9.	Lipostemmatinae (Berg), 1879, *Hem. Argent.*, p. 288 (Lipostemmatina).
Subfamily 10.	Henestarinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, p. 22 (Henestaridae).
Subfamily 11.	Pachygronthinae (Stål), 1865, *Hemipt. Afric.* **2**, pp. 121, 145 (Pachygronthida).
Subfamily 12.	Heterogastrinae (Stål), 1872, *Öfv. Vet.-Ak. Förh.* **29** : 40, 62 (Heterogastrina).

Synonym	Phygadicidae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera* (The oldest group name is Phygadicidae Douglas & Scott but we do not propose to use it and consequently invoke the saving clause, custom versus priority.)
Subfamily 13.	Chauliopinae Breddin, 1907, *Deutsch. ent. Zeit.* **1907** : 40.
Subfamily 14.	Artheneinae (Stål), 1872, *Öfv. Vet.-Ak. Förh.* **29** : 38, 47 (Artheneina).
Subfamily 15.	Phasmosomatinae (Kiritshenko), 1938, *Trud. Zool. Inst. Baku*, **8** : 117. *N.B.* The subfamily Bledionotinae Reuter, 1878, is regarded as only a tribe of the Megalonotinae.
Family	***Pyrrhocoridae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxviii, 265 (Pyrrhocorides).
Synonym	Pyrrhocoridae Dohrn, 1859, *Cat. Hemipt.*, p. 36.
Synonym	Astemmatidae Spinola, 1850, *Tav. Sin. Hem.*, ex *Mem. Mat. Fis. Soc. Ital. Sci. Modena*, **25** : 79 (1852).
Family	***Largidae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxviii, 273 (Largides).
Synonym	Largidae Dohrn, 1859, *Cat. Hemipt.*, p. 36.
Synonym	Euryopthalminae Van Duzee, 1916, *Check-list Hemipt. America N. of Mexico*, p. 24.
Family	***Piesmatidae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, p. xl (Piesmides).
Synonym	Piesmidae Spinola, 1850, *Tav. Sin. Hem.* ex *Mem. Mat. Fis. Soc. Ital. Sci. Modena*, **25** : 84 (1852).
Synonym	Zosmenidae Dohrn, 1859, *Cat. Hemipt.*, p. 41.
Synonym	Zosmeridae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 237.
Family	***Thaumastocoridae*** Kirkaldy, 1908, *Proc. Linn. Soc. N.S. Wales*, **32** : (corrigenda).
Synonym	Thaumastotheriinae Kirkaldy, 1908, *Proc. Linn. Soc. N.S. Wales*, **32** : 777.
Subfamily 1.	Thaumastocorinae Kirkaldy, 1908, *Proc. Linn. Soc. N.S. Wales*, 1907, **32** : 768–788.
Subfamily 2.	Xylastodorinae Barber, 1920, *Bull. Brooklyn ent. Soc.* **15** : 98–105.
Synonym	Discocorinae Kormilev, 1955, *Rev. Soc. Ent. Argentina* **18** : 7–10.
Family	***Berytidae*** Fieber, 1851, *Genera Hydroc.*, p. 9.
Synonym	Neididae Kirkaldy, 1902, *Journ. Bombay Nat. Hist. Soc.* **14** : 302. (There is no need to change the old family name Berytidae because *Berytus* F., 1803, is a synonym of *Neides* Latr., 1802.)
Subfamily 1.	Berytinae Puton, 1886, *Cat. Hémipt. Palaearct.* edn. 3, p. 19.
Subfamily 2.	Metacanthinae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, pp. 99, 145.
Family	***Colobathristidae*** (Stål), 1866, *Hemipt. Afric.* 2, p. 121 (Colobathristida).
Family	***Aradidae*** (Spinola), 1837, *Essai Hémipt.*, p. 157 (Aradites).
Subfamily 1.	Isoderminae Stål, 1872, *Svenska Vet.-Ak. Handl.* **10** : 4.
Subfamily 2.	Prosympiestinae Usinger & Matsuda, 1959, *Class. Aradidae, Brit. Mus.* p. 62.

Subfamily 3. Chinamyersiinae Usinger & Matsuda, 1959, *Class. Aradidae, Brit. Brit. Mus.* p. 79.

Subfamily 4. Aradinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xli, 306 (Aradides).

Subfamily 5. Calisiinae (Stål), 1873, *Svenska Vet.-Ak. Handl.* **11**, No. 2 : 138 (Calisaria).

Subfamily 6. Aneurinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, pp. 26, 267 (Aneuridae).

Subfamily 7. Carventinae Usinger, 1950, *VIIth Intern. Congr. Ent.*, p. 176.

Subfamily 8. Mezirinae Oshanin, 1908, *Verz. Paläark. Hem.*, pp. 4, 78.

Synonym Brachyrhynchinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xli, 303 (Brachyrhynchides).

Synonym Dysodiinae Reuter, 1912, *Öfv. Finska Vet. Soc. Förh.* **54A** : 33, 49, 57.

Synonym Chelonocorinae Miller, 1938, *Ann. Mag. Nat. Hist.* (11) **1** : 498–510.

Family ***Termitaphididae*** Myers, 1924, *Psyche*, **31**, 6 : 267.

Synonym Termitocoridae Silvestri, 1911, *Portici Boll. Lab. Zool.* **5** : 231–236.

Family ***Joppeicidae*** Reuter, 1910, *Acta Soc. Sci. Fenn.* **37**, 3 : 75.

Family ***Tingidae*** (Costa A), 1838, *Cimicum Regnis Neap. Cent.* **1** : 18, (Tingini).

Synonym Tingidites Laporte, 1832, *Essai Classif. Syst. Hém.* p. 47 ; invalidated as so-called vernacular name by Int. Comm. Zool. Nomenclature, Direction 6, *Opinion and Declarations I.C.Z.N.* Vol. 2, Sect. 13, 1954.

Synonym Tingidae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xi, 295 (Tingides).

Synonym Tingitidae auctt. Invalidated by International Commission on Zoological Nomenclature. Opinion 143 (1943).

Subfamily 1. Tinginae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, p. 24 (Tingididae).

Subfamily 2. Cantacaderinae (Stål), 1873, *Enum. Hemipt.* **3** : 116 (Cantacaderaria).

Subfamily 3. Agramminae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, pp. 24, 242 (Agrammidae).

Synonym Serenthiinae Stål, 1873, *Enum. Hemipt.* **3** : 116.

Family ***Vianaididae*** Kormilev, 1955, *Rev. Ecuat. Ent.* **2** (3–4) : 465–477.

Family ***Enicocephalidae*** (Stål), 1860, *Rio Jan. Hémipt. I* : 81 *K. Svensk. Vet.-Ak. Handl.* **2**, No. 7, 1858.

Synonym Henicocephalidae (Stål), 1865, *Hemipt. Afric.* **3**, p. 165 (Henicocephalida).

Subfamily 1. Enicocephalinae Ashmead, 1893, *Proc. Ent. Soc. Wash.* **2** : 328.

Subfamily 2. Aenictopechinae Usinger, 1932, *Pan Pacific Entomologist*, **8** : 149.

Family ***Phymatidae*** (Laporte), 1832, *Essai Classif. Syst. Hémipt.*, p. 14 (Phymatites).

Synonym Phymatides Amyot & Serville, 1843, *Hist. nat. Hémipt.*, pp. xxxix, 288.

Synonym Macrocephalidae Kirkaldy, 1899, *Entomologist* **32** : 221.

Subfamily 1.	Macrocephalinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxix, 291 (Macrocephalides).
Synonym	Macrocephalinae (Dohrn), 1859, *Cat. Hemipt.*, p. 41 (Macrocephalidae).
Subfamily 2.	Phymatinae (Dohrn), 1859, *Cat. Hemipt.*, p. 41 (Phymatidae).
Subfamily 3.	Carcinocorinae Handlirsch, 1897, *Ann. K.K. Nat. Hofmus. Wien*, **12** : 142.
Subfamily 4.	Themonocorinae (Carayon, Usinger & Wygodzinski), 1958, *Rev. Zool. bot. Afr.* **57** fasc. 3–4 : 278 (Themonocorini). These authors regard the genus *Themonocoris* as intermediate between the Reduviidae and Phymatidae and consequently sink the latter family to subfamily rank in the Reduviidae, placing *Themonocoris* in a tribe. We prefer for the present to retain the Phymatidae as a family and to raise the tribe Themonocorini to subfamily rank.
Family	***Elasmodemidae*** Lethierry & Severin, 1896, *Cat. Hémipt.* **3** : 49.
Synonym	Elasmocorinae Usinger, 1943, *Ann. ent. Soc. Amer.* **36** : 612.
Synonym	Elasmodemidae Wygodzinski, 1944, *Revue Brasil. Biol.* **4**(2) : 205.
Family	***Reduviidae*** Latreille, 1807, *Gen. Crust. Ins.* **3** : 126.
Subfamily 1.	Emesinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlviii, 393 (Emesides).
Synonym	Emesinae Spinola, 1850, *Tav. Sin. Hem.*, p. 45 ex *Mem. Mat. Fis. Soc. Ital. Sci. Modena*, **25** (1852).
Synonym	Ploiariinae, Costa, 1852, *Cimic, Regni Neap. Cent.* **4** : 66.
Subfamily 2.	Saicinae (Stål), 1859, *Berlin ent. Zeit.* **3** : 328 (Saicida).
Subfamily 3.	Visayanocorinae Miller, 1952, *Eos*, **28** : 88–90.
Subfamily 4.	Holoptilinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlii, 318 (Holoptilides).
Synonym	Holoptilinae (Stål), 1859, *Berlin ent. Zeit.* **3** : 328 (Holoptilida).
Subfamily 5.	Tribelocephalinae (Stål), 1866, *Hemipt. Afric.* 3, p. 44 (Tribelocephalida).
Subfamily 6.	Bactrodinae (Stål), 1866, *Hemipt. Afric.* 3, p. 45 (Bactrodida).
Subfamily 7.	Stenopodinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlviii, 386 (Stenopodides).
Synonym	Stenopodinae (Stål), 1859, *Berlin ent. Zeit.* **3** : 328 (Stenopodida).
Subfamily 8.	Salyavatinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xliv, 349 (Salyavatides).
Synonym	Salyavatinae (Stål), 1859, *Berlin ent. Zeit.* **3** : 328 (Salyavatida).
Subfamily 9.	Sphaeridopinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlvii, 381 (Sphaeridopides).
Synonym	Sphaeridopinae (Pinto), 1927, *Bol. Biol. S. Paulo*, **6** : 43, 47 (Sphaeridopidae).
Subfamily 10.	Manangocorinae Miller, 1954, *Idea*, **10** : 2.
Subfamily 11.	Physoderinae Miller, 1954, *Tijdsch v, Ent.* **96** : 82.
Subfamily 12.	Centrocneminae Miller, 1956, *Bull. Brit. Mus. Ent.* **4** : 219–283.

Subfamily 13.	Chryxinae Champion, 1898, *Biol. Centr. Amer. Rhynchota, Het.* **2** : 180.
Subfamily 14.	Vesciinae Fracker & Bruner, 1924, *Ann. ent. Soc. Amer.* **17** : 165.
Synonym	Chopardititae Villiers, 1944, *Bull. Soc. ent. Fr.* **49** : 79.
Subfamily 15.	Cetherinae Jeannel, 1919, *Voy. Alluaud Jeannel Afr. or., Hém.*, 1911–12, p. 178.
Synonym	Eupheninae Miller, 1955, *Ann. Mag. nat. Hist.* (12) **8** : 449–452.
Subfamily 16.	Reduviinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xliii, 333 (Reduviides).
Synonym	Reduviinae Spinola, 1850, *Tav. Sin. Hem.*, p. 145, ex *Mem. Mat. Fis. Soc. Ital. Sci. Modena*, **25** (1852).
Synonym	Acanthaspinae (Stål), 1866, *Hemipt. Afric.* **3**, p. 44 (Acanthaspidida).
Subfamily 17.	Triatominae Jeannel, 1919, *Voy. Alluaud Jeannel Afr. or., Hém.*, pp. 176, 177.
Synonym	Conorhininae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlviii, 383 (Conorhinides).
	Note. Although Conorhininae would be the oldest group name we do not intend to break current usage of Triatominae. *Conorhinus* Laporte, 1832 (p. 77) is an unnecessary new name for *Triatoma* Laporte, 1832, (p. 11).
Subfamily 18.	Piratinae (Stål), 1859, *Berlin ent. Zeit.* **3** : 328 (Peiratida).
Subfamily 19.	Phimophorinae Handlirsch, 1897, *Verh. zool. bot. Ges. Wien*, **47** : 408.
Subfamily 20.	Mendanocorinae Miller, 1956, *Ann. Mag. nat. Hist.* (12), **9** : 587–589.
Subfamily 21.	Hammacerinae (Stål), 1859, *Berlin ent. Zeit.* **3** : 328 (Hammacerida).
Synonym	Hammatocerinae (Stål), 1862, *Stett. ent. Zeit.* **23** : 455 (Hammatocerida).
Synonym	Microtominae Schumacher, 1924, *Deutsch ent. Zeit.* **1924** : 336.
Subfamily 22.	Ectrichodiinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xliv, 342 (Ectrichodides).
Synonym	Ectrichodiinae Spinola, 1850, *Tav. Sin. Hem.*, pp. 44, 45, ex *Mem. Mat. Fis. Soc. Ital. Sci. Modena*, **25** (1852).
Subfamily 23.	Rhaphidosominae Jeannel, 1919, *Voy. Alluaud Jeannel Afr. or., Hém.*, p. 263.
Subfamily 24.	Harpactorinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlv, 355 (Harpactorides).
Synonym	Harpactorinae Spinola, 1850, *Tav. Sin. Hem.*, p. 45, ex *Mem. Mat. Fis. Soc. Ital. Sci. Modena*, **25** (1852).
Synonym	Reduviinae (Stål), 1859, *Öfv. Vet.-Ak. Förh.* **16** : 195 (Reduvides).
Subfamily 25.	Apiomerinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xliv, 350 (Apiomerides).
Synonym	Apiomerinae (Stål), 1859, *Berlin ent Zeit.* **3** : 328 (Apiomerida).
Subfamily 26.	Ectinoderinae (Stål), 1866, *Öfv. Vet.-Ak. Förh.* **23** : 245 (Ectinoderida).
Subfamily 27.	Phonolibinae Miller, 1952, *Eos*, **28** : 86.
Synonym	Perissorhynchinae Miller, 1952, *Eos*, **28** : 87.

Subfamily 28.	Tegeinae Villiers, 1948, *Hémipt. Réduv. Afr. noire*, p. 171.
Subfamily 29.	Diaspidiinae Miller, *Bull. Brit. Mus., Ent.* **8** : 2 (in press).
Family	***Pachynomidae*** (Stål), 1873, *Enum. Hemipt.* **3** : 107 (Pachynomina).
Synonym	Pachynomidae Carayon, 1954, *Bull. Soc. Zool. France* **79** : 191 (as a family).
Family	***Velocipedidae*** Bergroth, 1891, *Wien ent. Zeit.* **10** : 265.
Synonym	Scotomedinae Blöte, 1945, *Zool. Meded.* **25** : 323 (as subfamily of Nabidae).
Family	***Nabidae*** Costa, 1852, *Cimic. Regni. Neap. Cent.* **3** : 66.
Subfamily 1.	Nabinae Reuter, 1890, *Rev. Ent.* **9** : 293.
Synonym	Reduviolinae Reuter & Poppius, 1909 (not Reuter, 1890), *Acta. Soc. Sci. Fenn.* **37**, 2 : 3.
Synonym	Coriscinae (Stål), 1873, *Enum. Hemipt.* **3** : 106 (Coriscina).
Subfamily 2.	Prostemminae Reuter, 1890, *Rev. Ent.* **9** : 289.
Synonym	Nabinae Reuter & Poppius, 1909 (not Reuter, 1890), *Acta Soc. Sci. Fenn.* **37** : 2, 3.
Subfamily 3.	Arachnocorinae Reuter, 1890, *Rev. Ent.* **9** : 292.
Subfamily 4.	Gorpinae Reuter, 1909, *Ann. Soc. ent. belg.* **53** : 423.
Subfamily 5.	Carthasinae Blatchley, 1926, *Het. East N. Amer.*, pp. 538–539.
Family	***Polyctenidae*** Westwood, 1874, *Thesaur. Ent.*, p. 197.
Family	***Cimicidae*** (Latreille), 1804, *Hist. nat. Crust. Ins.* **12** : 235 (Cimicides).
Synonym	Cimicidae (Leach), 1815, *Brewster's Edinb. Encyc.* **9** : 122 (Cimicida).
Synonym	Acanthiadae Fieber, 1861, *Europ. Hemipt.*, pp. 37, 135.
Synonym	Acanthiidae Douglas & Scott, 1865 (*nec* Leach 1815), *Brit. Hémipt. Heteroptera* p. 37.
Synonym	Clinocoridae Kirkaldy, 1906, *Trans. Amer. ent. Soc.* **32** : 147.
Subfamily 1.	Cimicinae Van Duzee, 1916, *Check-list Hemipt. Amer. N. of Mexico*, p. 33.
Subfamily 2.	Haematosiphoninae Jordan & Rothschild, 1912, *Novit. Zool.* **19** : 352.
Subfamily 3.	Cacodminae Kirkaldy, 1899, *Bull. Liverpool Mus.* **2** : 45.
Subfamily 4.	Primicimicinae Usinger (in press).
Family	***Anthocoridae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxvii, 262 (Anthocorides).
Synonym	Anthocoridae Fieber, 1851, *Genera Hydroc.*, p. 9.
Subfamily 1.	Lyctocorinae Reuter, 1884, *Monog. Anthoc., Acta Soc. Sci. Fenn.* **14** (1885) : 558.
Subfamily 2.	Anthocorinae Reuter, 1884, *Monog. Anthoc., Acta Soc. Sci. Fenn.* **14** (1885) : 558.
Subfamily 3.	Dufouriellinae Van Duzee, 1916, *Check-list Hemipt. Amer. N. of Mexico*, p. 35.
Synonym	Xylocorinae Reuter, 1884, *Monog. Anthoc. Acta Soc. Sci. Fenn.* **14** (1885) : 558.
Family	***Microphysidae*** Dohrn, 1859, *Cat. Hemipt.*, p. 36.
Subfamily 1.	Microphysinae China, 1953, *Ann. Mag. nat. Hist.* (12), **6** : 73.
Subfamily 2.	Plokiophilinae China, 1953, *Ann. Mag. nat. Hist.* (12), **6** : 73.

Family		[1]***Miridae*** (Hahn), 1831, *Wanz. Ins.* 1, p. 234 (Mirides).
Synonym		Capsidae (Burmeister), 1835, *Handb. Ent.* 2, p. 263. (Capsini).
Synonym		Phytocoridae Fieber, 1858, *Wien ent. Monatschrift*, **2** : 289.
Subfamily	1.	Mirinae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xxxviii, 277 (Mirides).
Synonym		Mirinae (Reuter), 1910, *Acta. Soc. Sci. Fenn.* **37** : 109, 128, 155 (Mirina).
Subfamily	2.	Orthotylinae Van Duzee, 1916, *Check-list Hemipt. Amer. N. of Mexico*, p. 203.
Synonym		Heterotominae (Reuter), 1910, *Acta. Soc. Sci. Fenn.* **37**, 3 : 114 (Heterotomina).
Synonym		Cyllecorinae Oshanin, 1912, *Kat. Paläarkt. Hemipt.*, p. 72.
Subfamily	3.	Phylinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, pp. 30, 346 (Phylidae).
Synonym		Plagiognathinae Oshanin, 1912, *Kat. Paläarkt. Hemipt.*, p. 77.
Subfamily	4.	Brycorinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, pp. 28, 276 (Bryocorida).
Subfamily	5.	Deraeocorinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, pp. 29, 315 (Deraeocoridae).
Synonym		Termatophylidae (Reuter), 1888, *Wien. ent Zeit.* **3** : 218 (Termatophylina).
Synonym		Cliveneminae (Reuter), 1875, *Caps. Bor. Amer.* p. 62 ; *Öfv. Vet.-Ak. Förh.* **32** No. 9 : 54–92 (Clivenemaria).
Synonym		Hyaliodinae Knight, 1943, *Ent. News*, **54** (5) : 19.
Synonym		Ambraciinae (Reuter), 1910, *Acta. Soc. Sci. Fenn.* **37** : 109, 154 (Ambraciina).
Subfamily	6.	Cylapinae Kirkaldy, 1903, *Wien. ent. Zeit.* **22** : 13.
Synonym		Bothynotinae (Reuter), 1910, *Acta. Soc. Sci. Fenn.* **37** : 109, 155 (Bothynotina).
Synonym		Lygaeoscytinae (Reuter), 1910, *Acta. Soc. Sci. Fenn.* **37** : 110.
Family		***Isometopidae*** Fieber, 1860, *Wien ent. Monat.* **4** : 259.
		Carayon, probably rightly, suggests that the Isometopidae are merely a subfamily of Miridae.
Family		***Dipsocoridae*** Dohrn, 1859, *Cat. Hemipt.*, p. 36.
Synonym		Cryptostemmatidae McAtee & Malloch, 1925, *Proc. U.S. Nat. Mus.* **17** : 1.
Synonym		Ceratocombidae Fieber, 1860, *Europ. Hemipt.*, pp. 25, 39, 142.
Family		***Schizopteridae*** (Reuter), 1891, *Acta Soc. Sci. Fenn.* **19**, 6 : 3 (Schizopterina).
Family		***Hydrometridae*** (Billberg), 1820, *Enum. Ins. Mus. Billb.*, p. 67 (Hydrometrides).
Synonym		Limnobatidae Fieber, 1860, *Europ. Hemipt.*, p. 23.

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[1] The synonyms of Douglas & Scott listed in our previous paper (1955) have been omitted under each subfamily as not completely covering the same field as the current subfamilies. Tribal names have also been omitted.

Subfamily	1.	Hydrometrinae Esaki, 1927, *Entomologist*, **60** : 4.
Subfamily	2.	Limnobatodinae Esaki, 1927, *Entomologist*, **60** : 4.
Subfamily	3.	Heterocleptinae Villiers, 1948, *Réduv. Afr. noire*, p. 174 (described in the Reduviidae).
Synonym		Hydrobatodinae China & Usinger, 1949, *Rev. Zool. Bot. Afr.* **41** : 4 : 318.
Family		***Gerridae*** Leach, 1815, *Brewster's Edinb. Encyc.* **9** : 123.
Synonym		Gerridae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. l, 410 (Gerrides).
Synonym		Hydrometridae (Fieber), 1860, *Europ. Hemipt.*, p. 24 (Hydrometrae).
Subfamily	1.	Gerrinae Bianchi, 1896, *Ann. Mus. Petersb.* **1896** : 69.
Subfamily	2.	Halobatinae Bianchi, 1896, *Ann. Mus. Petersb.* **1896** : 69.
Subfamily	3.	Hermatobatinae Coutière & Martin, 1901, *C.R. Acad. Sci. Paris*, **132** : 1066–1068.
Subfamily	4.	Rhagadotarsinae Lundblad, 1933 *Archiv. für Hydrobiol. Suppl.* **12** : 411.
Subfamily	5.	Ptilomerinae Esaki, 1927, *Eos.* **2** : 252.
Family		***Veliidae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. l., 418 (Velides).
Synonym		Veliidae Dohrn, 1859, *Cat. Hemipt.*, p. 53.
Synonym		Veliidae (Reuter), 1912, *Öfv. Finska Vet. Soc. Förh.* **6** : 14, 18. (Veliadae).
Subfamily	1.	Perittopinae China & Usinger, 1949, *Ann. Mag. nat. Hist.* (12), **2** : 350.
Subfamily	2.	Rhagoveliinae China & Usinger, 1949, *Ann. Mag. nat. Hist.* (12), **2** : 350.
Subfamily	3.	Hebroveliinae (Lundblad), 1939, *Ent. Tidsk.* **60**, 1–2 : 33 (Hebroveliidae).
Subfamily	4.	Hydroessidae (Fieber), 1860, *Europ. Hemipt.*, p. 23 (Hydroessae).
Synonym		Microveliinae China & Usinger, 1949, *Ann. Mag. nat. Hist.* (12), **2** : 351.
Subfamily	5.	Veliinae China & Usinger, 1949, *Ann. Mag. nat. Hist.* (12), **2** : 351.
Subfamily	6.	Haloveliinae Esaki, 1930, *Journ. F. Malay S. Mus.* **16** : 22.
Synonym		Haloveliidae Poisson, 1956, *Mém. Inst. Sci. Madagascar* (E) **7** : 255.
Family		***Mesoveliidae*** Douglas & Scott, 1867, *Ent. mon. Mag.* **4** : 3.
Synonym		Mesoveliadae Reuter, 1912, *Öfv. Finsk. Vet. Soc. Förh.* **6** : 17, 23, 47, 49.
Subfamily	1.	Mesoveliinae Usinger (in press).
Subfamily	2.	Mesoveloideinae Usinger (in press). (See Hungerford 1929, *Bull. Brooklyn ent. Soc.* **24** : 228.)
Subfamily	3.	Macroveliinae (McKinstry), 1942, *Pan Pacif. Ent.* **18** : 91 (Macroveliidae).
Family		***Hebridae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xl, 293 (Hebrides).
Synonym		Naeogeidae Kirkaldy, 1902, *Faun. Hawaii*, **3**, p. 168.

Family		***Leotichiidae*** China, 1933, *Ann. Mag. nat. Hist.* (10) **12** : 185.
Family		***Leptopodidae*** Costa, 1838, *Cimic. Regni, Neap. Cent.* 1, *Atti. real. Ist. incorragg. alle Sci. nat. Nap.* **7** : 151, 1847.
Family		***Saldidae*** (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. xlix (Saldides).
Synonym		Saldidae Costa, 1852, *Cimic. Regni. Neap. Cent.* 3, *Atti. real. Ist. incorragg. alle Sci. nat. Nap.* **8** : 66, 1855.
Synonym		Acanthiidae Leach, 1815, *Brewster's Edinb. Encyc.* **9** : 123.
Synonym		Acanthiadae Fieber, 1860, *Europ. Hemipt.*, p. 24.
Subfamily	1.	Saldinae Van Duzee, 1917, *Cat. Hemipt. America north of Mexico*, p. 438.
Subfamily	2.	Saldoidinae Reuter, 1912, *Öfv. Finska Vet.-Soc. Förh.* **54**A, No. 12 : 23.
Subfamily	3.	Aepophilinae (Puton), 1879, *Synop. Hém. Het. France*, 2, p. 145 (Aepophilidae).
		Note. Leston has recently, wrongly in our opinion, reduced the Aepophilinae to tribal rank under Saldinae (*Nature*, **178** : 427).
Family		***Notonectidae*** Leach, 1815, *Brewster's Edinb. Encyc.* **9** : 124.
Subfamily	1.	Anisopinae Hutchinson, 1929, *Ann. S. Afr. Mus.* **25**, 3 : 362.
Subfamily	2.	Notonectinae Leach, 1815, *Brewster's Edinb. Encyc.* **9** : 124.
Family		***Pleidae*** (Fieber), 1851, *Genera Hydroc.*, p. 27 (Pleae).
Family		***Helotrephidae*** Esaki & China, 1927, *Trans. ent. Soc. Lond.* **1927** : 280.
Subfamily	1.	Neotrephinae China, 1940, *Ann. Mag. nat. Hist.* (11), **5** : 123.
Subfamily	2.	Idiocorinae Esaki & China, 1927, *Trans. ent. Soc. Lond.* **1927** : 280.
Subfamily	3.	Helotrephinae Esaki & China, 1927, *Trans. ent. Soc. Lond.* **1927** : 280.
Family		***Corixidae*** Leach, 1815, *Brewster's Edinb. Encyc.* **9** : 124.
Synonym		Corixidae (Amyot & Serville), 1843, *Hist. nat. Hémipt.*, pp. li, 444 (Corisides).
Subfamily	1.	Micronectinae Jaczewski, 1924, *Ann. Zool. Mus. Polon. Hist. nat.* **3** : 3.
Synonym		Sigaridae Douglas & Scott, 1865, *Brit. Hemipt. Heteroptera*, p. 50.
		Note. The genus *Sigara* F. on which Douglas & Scott's name is based belongs to the Corixinae.
Subfamily	2.	Diaprepocorinae Lundblad, 1928, *Entom. Tidsk.* **1** : 9.
Subfamily	3.	Corixinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, p. 50 (Corixidae).
Subfamily	4.	Stenocorixinae Hungerford, 1948, *Univ. Kansas Sci. Bull.* **32** : 43.
Subfamily	5.	Cymatiinae Walton, 1940, *Trans. Connect. Acad. Arts. Sci.* **33** : 344.
Subfamily	6.	Heterocorixinae Hungerford, 1948, *Univ. Kansas Sci. Bull.* **32** : 43.
Family		***Nepidae*** (Latreille), 1802, *Hist. nat. Crust. Ins.* 3, p. 252 (Nepariae).
Subfamily	1.	Nepinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, p. 47. (Nepidae).
Subfamily	2.	Ranatrinae (Douglas & Scott), 1865, *Brit. Hemipt. Heteroptera*, p. 46 (Ranatridae).
Family		***Belostomatidae*** (Leach), 1815, *Brewster's Edinb. Encyc.* **9** : 123 (Belostomida).

Synonym		Belostomidae Dohrn, 1859, *Cat. Hemipt.*, p. 54.
Family		***Naucoridae*** Fallèn, 1814, *Spec. Nov. Disp. Meth.*, pp. 3, 15.
Subfamily	1.	Naucorinae Stål, 1876, *Enum. Hemipt.* 5, p. 142.
Subfamily	2.	Limnocorinae Stål, 1876, *Enum. Hemipt.* 5, p. 142.
Subfamily	3.	Laccocorinae Stål, 1876, *Enum. Hemipt.* 5, p. 142.
Subfamily	4.	Cryphocricinae Montandon, 1897, *Verh. Zool. Bot. Ges. Wien*, **47** : 6.
Subfamily	5.	Ambrysinae Usinger, 1941, *Ann. ent. Soc. Amer.* **34** : 911.
Subfamily	6.	Cheirochelinae Montandon, 1897, *Ann. Mus. Civ. Genova*, **37** : 367.
Subfamily	7.	Potamocorinae Usinger, 1941, *Ann. ent. Soc. Amer.* **34** : 8 9.
Subfamily	8.	Aphelocheirinae (Fieber) 1860, *Europ. Hemipt.*, p. 23 (Aphelochirae).
Synonym		Aphelocheiridae auctt.
Family		***Gelastocoridae*** Kirkaldy, 1897, *Entomologist*, **30** : 258.
Synonym		Galgulidae (Billberg), 1820, *Enum. Ins. Mus. Billb.*, p. 66 (Galgulides).
Subfamily	1.	Gelastocorinae Champion, 1901, *Biol. Centr. Amer. Rhynchota, Het.* 2, p. 437.
Subfamily	2.	Mononychinae (Fieber), 1851, *Genera Hydroc.*, pp. 9, 12 (Mononycoidea).
Synonym		Nerthrinae (Kirkaldy), 1906, *Trans. ent. Soc. Amer.* **32** : 149 (Nerthridae).
Family		***Ochteridae*** Kirkaldy, 1906, *Trans. Amer. ent. Soc.* **32** : 149.
Synonym		Pelogoniidae (Leach), 1815, *Brewster's Edinb. Encyc.* **9** : 123 (Pelogonida).

Note. We have been advised that it is preferable to retain the name Ochteridae which has been in use for fifty-one years and to invoke the saving clause of current usage to prevent its being replaced by Pelogoniidae which is actually the older group name.

Ochterus Latr. 1807 has priority over *Pelogonus* Latr. 1809 which was an unnecessary new name for *Ochterus* Latr. nec. *Ochthera* Latr. 1802 Diptera.

KEY TO FAMILIES OF *Heteroptera*

1. Abdominal trichobothria absent[1] 2
– Abdominal trichobothria present 39
2. Three pairs of trichobothria on head, (difficult to observe in some genera such as *Aepophilus*, *Hermatobates et al.*), rarely only 2 pairs (Limnobatodinae), or confused with bristles (Leptopodidae and Leotichiidae) . . . *Amphibicorisa.* 3
– No trichobothria on head, sometimes bristles present but no sensory setae . . . 10
3. Claws terminal 4
– Claws inserted before apex of tarsus (except Gerrid genus *Eotrechus*) . . . 9
4. Trichobothria often indistinct hidden or confused with numerous spines or a dense pubescence 5

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[1] Although the presence of regularly arranged trichobothria is fairly easy to observe, their absence is much less easy to ascertain. In very hairy species the trichobothria may be hidden or may be confused with ordinary hairs. In some genera of the trichophorous families they appear to be absent, e.g. *Oxycarenus*, *Lestonia*, *Aphylus*. In the Reduviid genus *Catamiarus* there appear to be numerous ventral trichobothrioid setae regularly arranged.

– Trichobothria distinct, head not spiny or densely pubescent 6

5. Compound eyes on ventral surface of head directed downwards ; second antennal segment thickened like first ; pronotum with a distinct percurrent median carina ; dorsal surface of head densely covered with short setae ; basal segments of rostrum without spines or bristles.

A single genus of 2 species of Malayan cave-bugs living amongst bat guano LEOTICHIIDAE China, 1933

– Compound eyes normal ; second antennal segment much more slender than first ; pronotum without a percurrent median carina ; dorsal surface of head with numerous hairs or spines but not densely covered with short setae ; basal segments of rostrum armed with spines or spine-like bristles directed laterally.

A small family of Old World cursorial, predaceous bugs, often spiny living in dry situations . . . . LEPTOPODIDAE Costa, 1838

6. Head long and narrow, as long or longer than the entire thorax ; eyes placed near middle ; antennae 4- or 5-segmented ; metasternum with 1 or 2 omphalia ; apterous forms common.

Usually slender, stick-like insects walking on surface of water near shore. Rarely terrestrial ; in damp moss (*Heterocleptes*) . HYDROMETRIDAE (Billberg), 1820

– Head shorter, not exceeding the combined length of pronotum and scutellum . . 7

7. Bucculae forming a distinct longitudinal groove along entire underside of head ; tarsi 2-segmented.

Very small, robust species ; brachypterous forms occur. Rostrum apparently 3-segmented ; antennae 4–5-segmented . . HEBRIDAE (Amyot & Serville), 1843

– Bucculae not forming such a groove 8

8. Eyes large with inner margins excavate ; ocelli present, often contiguous ; membrane of hemelytron with 4 rarely 5 parallel-sided closed cells ; mandibular plates prominently convex, transverse and shining ; scutellum large and triangular usually longer than broad ; apterous forms unknown.

Fairly large family of small littoral, cursorial bugs running and jumping on mud and sand or amongst damp grass near water SALDIDAE (Amyot & Serville), 1843

– Eyes medium sized, inner margins not distinctly excavate ; ocelli present, never contiguous ; membrane of hemelytron never with 4 or 5 closed cells sometimes without cells or with membrane broken off or with membrane undifferentiated from corium (Macroveliinae) ; mandibular plates not as above ; scutellum usually bilobed or if simple triangular (Mesoveloideinae), shorter than wide at base ; apterous forms common.

Small family of relatively small species walking on floating vegetation MESOVELIIDAE Douglas & Scott, 1867

9. Legs inserted more or less equidistantly (except in Haloveliinae[1]) ; vertex usually with a distinct, percurrent, median longitudinal suture or glabrous line, rarely obsolete in which case eyes small not extending backwards on to sides of pronotum; scent glands usually with paired lateral channels terminating above hind acetabula in a tuft of hairs ; inner margin of eyes straight ; male harpagones large and distinct.

Skating actively on surface of streams and ponds and, rarely, on surface of sea near shore . . . . VELIIDAE (Amyot & Serville), 1843

– Front legs widely separated from middle and hind pair. Vertex usually without a distinct percurrent median longitudinal suture or line, rarely present, in which case eyes large distinctly extending backwards on to sides of pronotum ; scent glands medial (omphalium) usually without lateral channels (except in *Brachymetra Cylindrostethus et al.*) ; inner margin of eyes usually sinuate ; male harpagones rudimentary.

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[1] See China, W. E., 1957, *J. Linn. Soc. London*, **43** (No. 291), p. 352.

Skating on surface of all kinds of water including the sea and sometimes found in mid-ocean (*Halobates*) . . . . GERRIDAE Leach, 1815

10. Antennae strongly reduced, shorter than head, placed in grooves under the eyes or exceptionally, in the Aphelocheirine and Potamocorine Naucoridae and in the Ochteridae, very short, but visible from above . . . . . *Hydrocorisa* 11

— Antennae much longer than head, always visible from above . . *Geocorisa* 19

11. Rostrum very short and broad, sunk into clypeus, not distinctly segmented ; front tarsi modified into spatulate palae fringed with stiff bristles ; base of head laminate, overlapping front of pronotum ; neanides (larvae) with 3 dorsal abdominal scent gland openings ; head as wide or wider than pronotum, hind tibiae flattened and fringed with swimming hairs ; tarsi without claws.

True water bugs with air bubble respiration . . CORIXIDAE Leach, 1815

— Rostrum cylindrical or cone-shaped, distinctly 3- or 4-segmented ; front tarsi not as above ; base of head inserted into pronotum ; neanide without or with only 1 dorsal scent gland opening 12

12. Head fused with pronotum to form a cephalonotum ; boundary between them indicated by a shallow dorsal, sinuate suture ; antennae 1 or 2-segmented ; ovipositor absent.

True water bugs, usually strongly convex dorsally, hemelytral membrane strongly reduced . . . . . . HELOTREPHIDAE Esaki & China, 1927

— Head and pronotum not fused ; sometimes partly so, but then suture deep and straight ; antennae 3- or 4-segmented ; ovipositor present 13

13. Abdomen with a pair of long, slender posterior appendages forming a respiratory siphon ; hind coxae short, free, rotary ; anterior legs raptorial ; tarsi 1-segmented; ocelli absent ; wings present, reticulately veined, but not functional.

Water bugs living in vegetation close to the surface ; respiration by siphon NEPIDAE (Latreille), 1802

— Abdomen without such appendages or if present very short and broadly flattened (Belostomatidae) ; hind coxae fixed, broadly joined to thoracic pleura . . 14

14. Ocelli absent, middle and hind legs with fringes of long swimming hairs ; water bugs 15

— Ocelli present ; middle and hind legs without fringes of long swimming hairs ; shore bugs 17

15. Front legs modified for grasping prey with femur strongly thickened and anteriorly sulcate to form with the curved front tibia and tarsus a raptorial organ. Body broad and flattened 16

— Front legs simple, body strongly convex or tectiform 18

16. Outer margin of eyes continuous with lateral margin of dilated pronotum and front margin of head ; membrane of hemelytron without veins ; apex of abdomen without short strap-like appendages ; middle and hind tibiae and tarsi cylindrical with rows of bristles and weak swimming hairs.

Moderately sized rather flattened water bugs.; neanides with a pair of widely separated abdominal scent gland openings . . . NAUCORIDAE Fallèn, 1814

— Eyes more or less prominent, not at all continuous with lateral margins of pronotum and head ; membrane with reticulate veins ; apex of abdomen with a pair of short strap-like appendages (respiratory siphon) ; median and posterior tibiae and tarsi flattened with strong fringes of swimming hairs.

Large water bugs . . . . BELOSTOMATIDAE (Leach), 1815

17. Rostrum short not extending beyond anterior coxae ; antennae invisible from above, carried in grooves beneath eyes ; anterior legs raptorial, the femur very strong and broad with anterior surface either sulcate or flanged ; head transverse, the subpedunculate eyes widely separated ; scutellum irregularly tumid.

Toad bugs living and burrowing in mud and sand on banks of lakes and rivers GELASTOCORIDAE Kirkaldy, 1897

— Rostrum long, extending at least to posterior coxae. Antennae visible from above; anterior legs simple, similar to posterior and median legs, cursorial; head with vertex little wider than diameter of one eye; eyes not subpendunculate; scutellum flattened not tumid . . . . OCHTERIDAE Kirklady, 1906

18. Form elongate, wedge-shaped, abdomen without median ventral carina; antennae usually 4-segmented; posterior legs long oar-like without distinct claws; posterior tibiae flattened.

Medium sized. Back swimming water bugs more than 5 mm. long with air bubble respiration . . . . NOTONECTIDAE Leach, 1815

— Form oval, strongly convex; abdomen with distinct median ventral carina; antennae 3-segmented; posterior legs short, with 2 distinct claws; posterior tibiae cylindrical not flattened.

Small water bugs less than 5 mm. long . . . PLEIDAE (Fieber), 1851

19. Rostrum strongly dorso-ventrally flattened throughout, very broad at base and tapering to apex; front tibia usually widening from base to apex, the single segmented tarsus inserted on the outer edge of the truncate apex; hemelytra uniformly membranous, the corium not differentiated; no stridulatory furrow, the rostrum apparently 4-segmented.

Small to very small gnat-like bugs with short robust legs, often found flying in swarms; neanides live in rotten wood . . . . . ENICOCEPHALIDAE

— Rostrum not dorso-ventrally flattened throughout; front tibia and tarsus not as above; hemelytra rarely uniformly membranous in which case rostrum apparently 3-segmented, prosternal stridulatory furrow present or absent 20

20. Head with a dorsal transverse furrow or sulcus dividing it into two lobes, usually running between or just below the eyes; if obsolescent or indistinct (Triatominae and Sphaeridopinae) or completely absent (Visayanocorinae), then membrane of hemelytron with 2 large cells and at most one longitudinal vein extending from the apex of the posterior one 21

— Head without a dorsal transverse furrow or sulcus dividing it into two lobes; membrane of hemelytron seldom with two large cells in which case there are also several supernumary longitudinal veins extending from them towards the apical margin of the membrane 22

21. Membrane of hemelytron without cells but with 3 longitudinal veins; head and body extremely flattened both dorsally and ventrally; meso- and meta-sterna fused; thoracic scent glands present, hidden beneath the anterior border of the fused meso- and meta-sterna, submedially; legs multi-spinous.

Family based on a single genus from Brazil and Paraguay, inhabiting birds' nests and under bark . . . . *Elasmodemidae*

Note. It is almost certain that the W. African genus *Heteropinus* Breddin belongs here.

— Membrane of hemelytron with 2 large cells, never with 3 free longitudinal veins; head and body rarely strongly flattened and meso- and meta-sterna fused (*Durganda, Staliastes*) in which case membrane with 2 large cells and scutellum apically acute or spined; thoracic scent-gland openings apparently absent but hidden in posterior acetabulae. A very large and variable family of predatory bugs of world-wide distribution . . . . *Reduviidae*

22. Prosternum with stridulatory furrow; front legs usually fully raptorial, the front tibia and tarsus being fused; fore femur usually very strongly thickened, the curved tibia-tarsus closing on its anterior edge in a pincer-like manner; sometimes the front femur extending beyond the insertion of the tibia-tarsus to form a crab-like pincer. In *Themonocoris* the front legs are not truly raptorial, the tibia and tarsus are not fused, the tarsus being 2 segmented (see subfamily key to Phymatidae). Abdomen usually strongly dilated below base. Medium to small sized bugs living on flowering plants and predators on bees and other insects visiting the flowers. *Phymatiaae*

— Prosternum always without a stridulatory furrow ; front legs not truly raptorial, the front tibia and tarsus not fused 23

23. Basal rostral segment as wide as head at apex and apparently forming an apical lobe of the head from which it is delimited only by a suture so that the rostrum at first sight seems 3-segmented ; basal two-thirds of labrum dorsal ; bucculae absent; posterior lobe of pronotum very large and with a median longitudinal percurrent suture and lateral marginal carinae. Anterior femora very strongly incrassate. A very small family of predatory bugs formerly associated with the Nabidae and in many respects intermediate between the Nabidae and Reduviidae . Pachynomidae

— Basal rostral segment not as above, the labrum almost entirely ventral ; bucculae present 24

24. Bucculae strongly elevated and extending the whole length of the underside of head, forming a sulcus for the basal visible segment of rostrum ; sulcus closed anteriorly 25

— Bucculae not strongly elevated, not extending whole length of head ; if forming a sulcus (some Aradidae) then this not closed anteriorly 26

25. Hemelytra densely reticulate or areolate ; second antennal segment always shortest eyes always distinct ; head usually, but not always, with several anteriorly directed spines ; scutellum usually covered by pronotum, if visible, small and indistinct.
Small delicate bugs living on shrubs and low plants . Tingidae (Laporte), 1832

— Hemelytra coriaceous, lightly punctate, coleopteroid, without membrane ; second antennal segment longer than the first, eyes absent or obsolescent ; head always without spines ; scutellum small but distinct.
Minute, subterranean, tropical American bugs . . Vianaididae Kormilev, 1955

26. Eyes absent (inquilines or parasites) 27

— Eyes present 28

27. Completely apterous ; scale-like ; no ctenidia present ; maxillary and mandibular stylets coiled in head capsule.
Minute inquilines in termites' nests . . . Termitaphididae Myers, 1924

— Hemelytra rudimentary, ctenidia always present ; viviparous parasites living in the fur of bats . . . . . Polyctenidae Westwood, 1874

28. Antennae strongly thickened ; basal three segments equally thick and parallel sided (cylindrical) ; apical segment fusiform with apical region pubescent ; hairs of body, short and strongly curved ; antennophores very prominent, always visible from above ; mandibular and maxillary setae very long and coiled inside head capsule ; ocelli always absent, tarsi 2-segmented ; veins of corium strongly elevated.
Medium sized bugs, strongly flattened, living under bark and feeding on fungi. Often apterous . . . . . Aradidae (Spinola), 1837

— Antennae if thickened, irregularly so, not parallel sided (cylindrical) ; apical segment if fusiform without the apical pubescent area, hairs of body never short and strongly curved ; antennophores seldom prominent ; mandibular and maxillary setae normal, not coiled in head capsule ; ocelli present or absent, tarsi 2- or 3-segmented ; veins of corium seldom strongly elevated 29

29. Pronotum with a median longitudinal carina.
Small predatory insects living on shrubs in Egypt and Israel Joppeicidae Reuter, 1910

— Pronotum without a median longitudinal carina 30

30. Rostrum apparently 3-segmented (or sometimes apparently 2-segmented) (basal segment very short and hidden) 31

— Rostrum apparently 4-segmented (basal segment longer and visible). Rarely 3-segmented (some Microphysidae-*Mallochiola*, *Chinaola* and *Plokiophila*), in which case male genitalia symmetrical 34

31. Ocelli absent ; clypeus triangular, broadening apically to truncate apical margin, except in *Primicimex* in which case rostrum very short not reaching level of insertion of antennae ; hemelytra always rudimentary ; male genitalia asymmetrical ; female with opening to Ribaga's organ on ventral or dorsal surface of abdomen.

Small bloodsucking bugs living in the nests and lairs of birds and bats and in the houses of man . . . . CIMICIDAE (Latreille), 1804

— Ocelli usually present; clypeus parallel sided or narrowed to apex not broadened apically; hemelytra usually, developed, sometimes brachypterous (Anthocoridae). Ribaga's organ usually absent 32

32. Male genitalia symmetrical; rostrum with second visible segment (third actual) extremely long and slender; antennae slender throughout; hemelytra broad with costal margins strongly convex; cuneal fracture distinct but cuneus not otherwise well defined; membrane with numerous veins extending from basal cells; no apterous forms; tarsi 3-segmented. Small bugs running actively on ground.

No real information as to ecology. Oriental species only. VELOCIPEDIDAE Bergroth, 1891

— Male genitalia strongly asymmetrical; antennae not slender throughout at least 2 basal segments thicker than third and fourth; hemelytra more or less parallel-sided; membrane with few or no veins 33

33. Hemelytra with cuneus distinctly defined; tarsi 3-segmented; corium and clavus not or only feebly punctate; eyes never pedunculate or stylate.

A widely distributed family of small, blackish bugs living in flowers, litter and stored products. Many species are predaceous ANTHOCORIDAE (Amyot & Serville), 1843

— Hemelytra without a cuneus; tarsi 2-segmented; corium and clavus strongly punctate; eyes usually pedunculate or stylate.

A small family of Lygaeid-like bugs restricted to Australia, S. India, Argentina and Antilles. Drake & Slater (1957) regard this family as related to the Cimicoidea THAUMASTOCORIDAE Kirkaldy; 1908

34. Male genitalia symmetrical 35

— Male genitalia asymmetrical 36

35. Tarsi 2-segmented; cuneal fracture present; eighth ventrite in female divided into 2 plates on each side of ovipositor when present; membrane with a single square cell at base between 2 longitudinal veins, rarely without such a cell (*Chinaola*) or without venation (*Plokiophila*).

A very small family of minute predaceous bugs living on the bark of trees and shrubs, in moss and amongst lichens. The males are usually macropterous and the females brachypterous. Two tropical American genera, which Carayon regards as representing a new family, live in webs, *Plokiophila* in spiders' webs and *Embiophila* in Embiid webs . . . . . . MICROPHYSIDAE Dohrn, 1859

— Tarsi 3-segmented; no cuneal fracture, cuneus absent; eighth ventrite in female not divided into 2 plates on each side of ovipositor when the latter is present; membrane in macropterous forms with numerous short veins radiating to the margins from 3 or more large basal cells. No sexual dimorphism although brachypterous or apterous specimens common. Ocelli sometime absent in insular species.

Medium sized predatory bugs living in low vegetation; some arboreal species NABIDAE Costa, 1852

36. Antennae with the 2 basal segments short and thickened, the 2 apical segments long and thin, covered with long erect hairs or setae; hemelytral membrane with variable venation but without an arcuate basal cell as below 37

— Antennae variable but never with the 2 apical segments long and thin and covered with long erect hairs; hemelytral venation consisting of a basal arcuate cell usually divided into 2 unequal cells by a longitudinal vein (except in Bryocorinae) rarely undivided or with secondary radial or reticulate veins, rarely without a basal cell (*Myrmecophyes*) in which case basal segment of rostrum long (4-segmented rostrum) 38

37. Head broad at apex, strongly deflexed; eyes large; hemelytron without a cuneal fracture.

Very small predatory bugs living in damp soil, moss or litter
SCHIZOPTERIDAE (Reuter), 1891

— Head more or less conical, porrect not deflexed; cuneal fracture present.
Small predatory bugs living in damp soil and under shingle along the shores of lakes and rivers . . . . DIPSOCORIDAE Dohrn, 1859

38. Ocelli absent; tarsi usually 3-segmented, rarely 2-segmented (*Mevius*, *Vannius* and *Peritropis*) in which case the first tarsal segment is very long; head seldom very strongly deflexed (Cylapinae).
A very large and variable family of medium to small bugs usually phytophagous but frequently predaceous . . . . MIRIDAE (Hahn), 1831

— Ocelli present, rarely absent; tarsi always 2-segmented, the first segment shorter than the second; head strongly deflexed almost perpendicularly to the body; vertex very short and usually narrow lying in the same plane as the body; ocelli usually almost contiguous; rarely vertex wider (*Isometopus*), and ocelli placed apart and close to eyes; second antennal segment always strongly modified either thickened or dilated or both.
A small family of small predatory bugs living on the bark of trees and shrubs. Carayon (1958) regards this family as only of subfamily rank within the Miridae.
ISOMETOPIDAE Fieber, 1860

39. Scutellum large, sometimes completely covering the abdomen and hemelytra; at least as long as clavus, if not (brachypterous forms), clavus corium and membrane fused; no claval commissure present (a very short one in Urostylidae); antennophores not or scarcely visible from above (except in Urostylidae) . . . 40

— Scutellum smaller, shorter than clavus, a distinct claval commissure present; antennophores visible from above; antennae 4-segmented 46

40. Lateral margins of abdomen very strongly laminately expanded; antennae 3-segmented; body strongly flattened.
A small family of S. American bugs living on the bark of trees and shrubs
PHLOEIDAE (Amyot & Serville), 1843

— Lateral margins of abdomen not or only slightly laminately expanded; antennae usually 5-segmented, rarely 4-segmented (Tessarotominae and the Scutellerine genera *Fitha* and *Tetarthria*); body usually not excessively flattened . . 41

41. Pronotum with large backwardly produced lateral lobes; meso- and metanotum visible from the side beneath the base of hemelytron; trichobothria obsolescent; tarsi 3-segmented.
Small Australian bugs (living on eucalyptus?) . APHYLIDAE (Bergroth), 1906

— Pronotum without large backwardly produced lateral lobes; meso- and metanotum not visible from side beneath base of hemelytron 42

42. Apices of median and posterior coxae with fringes of closely set stiff setae or pegs (*Strombosoma* and *Carrabas*); tibia usually multi-spinous.
Small to medium sized black or dull coloured, shining species often with a row of bristles along anterior margin of head; sometimes with anterior and posterior legs modified for digging. Usually feeding on the roots of plants
CYDNIDAE (Billberg), 1820

— Apices of median and posterior coxae without fringes of closely set stiff setae; tibiae not multispinous, at most with short stiff bristles or depressed hairs . . 43

43. Antennae inserted on lateral margin of head, antennophores cylindrical; ocelli more or less contiguous; claval commissure obsolescent.
Medium sized, rather delicate, phytophagous bugs of coreoid appearance; often found in swarms . . . . UROSTYLIDAE Dallas, 1851

— Antennae inserted below lateral margin of head; antennophores not cylindrical ocelli usually well separated; claval commissure absent. 44

44. Head, pronotum and part of costal margin of hemelytra strongly laminately expanded and recurved to produce a tortoise-like appearance; venter with a pair of

disk-shaped (sucking?) organs ; tarsi 2-segmented.

Represented by a single Australian genus and species ; small tortoise-like bug probably living on a smooth substrate such as Eucalyptus bark or leaves LESTONIIDAE (China), 1955

— Head, pronotum and costal margin of hemelytra not strongly laminately expanded and recurved ; not tortoise-like ; venter without sucking organs . . . 45

45. Hemelytra much longer than abdomen so that they are folded (elbowed) between membrane and corium in order to be hidden under scutellum ; scutellum always more or less covering the abdomen ; ventral abdominal segments with a straight, black, transverse sulcus on each side level with the trichobothria ; sometimes (*Plastaspis*) abdominal ventrites fused laterally.

Small to moderately large bugs usually very convex and shining on upper side and flattened on ventral side, living on shrubs and low plants PLATASPIDAE Dallas, 1851

— Hemelytra not or only slightly longer than abdomen, not folded (elbowed) between membrane and corium although at rest sometimes almost completely covered by the scutellum ; scutellum often not covering the abdomen so that hemelytra are fully exposed ; ventral abdominal segments without black transverse sulcus on each side ; abdominal ventrites rarely fused laterally.

A very large family of phytophagous and predaceous bugs showing considerable variation in form . . . . PENTATOMIDAE (Leach), 1815

46. Ocelli absent ; membrane of hemelytron usually with 2 basal cells from which 7–8 branching, longitudinal veins extend to the apical margin 47

— Ocelli present at least in macropterous forms, rarely absent (*Camptocera* in the Lygaeidae) in which case clavus regularly punctate 48

47. Sixth visible (seventh actual) ventral abdominal segment in the female cleft in middle

Medium to large brightly coloured, usually phytophagous bugs LARGIDAE (Amyot & Serville), 1843

— Sixth visible ventral abdominal segment entire in both sexes.

Medium sized bugs, brightly coloured, usually phytophagous, seed feeding species but rarely (*Dindymus*) predaceous PYRRHOCORIDAE (Amyot & Serville), 1843

48. Antennophores dorsal placed relatively close together rarely lateral (*Agraphopus* and *Maccevethus*) in which case membrane of hemelytra with numerous longitudinal veins, basal cells usually absent, rarely reticulate (*Pseudophloeus*).

Medium to large phytophagous bugs sometimes with dilated antennae or posterior tibiae ; posterior femora in male often strongly swollen and spined COREIDAE Leach, 1815

— Antennophores placed further apart, more or less lateral and ventral of a line from centre of eyes to apex of head ; membrane of hemelytra with not more than 6 veins 49

49. Female with the 2 dorsal abdominal segments anterior to the penultimate one, deeply arcuately incised ; the apical segment deeply sinuate ; membrane of hemelytron with 2 basal cells and several subreticulate veins ; head seen from side with tylus strongly elevated.

Known only from a unique female specimen from S. Australia. Not seen by the present authors . . . . HYOCEPHALIDAE Bergroth, 1906

— Female with abdomen not as above 50

50. Apices of slender femora clubbed ; antennae geniculate, the apices of the slender basal and apical segments thickened ; peritreme of thoracic scent gland openings laterally produced ; body and legs slender.

A small family of phytophagous bugs . . . . BERYTIDAE Fieber, 1851

— Apices of femora not clubbed ; antennae not geniculate 51

51. Antennae very long and slender ; scutellum spined.

A small family of medium sized phytophagous bugs with narrow elongate bodies and broad heads . . . . COLOBATHRISTIDAE (Stål), 1866

— Antennae robust not exceptionally long ; scutellum not spined 52

52. Corium, clavus and base of membrane areolate, tarsi 2-segmented ; membrane in macropterous forms, with 4 straight veins.
A very small family of small phytophagous bugs
PIESMATIDAE (Amyot & Serville), 1843

— Corium and clavus regularly punctate but not areolate ; tarsi 3-segmented ; membrane of hemelytron with 5 or 6 sinuate veins 53

53. Juga acuminate and contiguous at base in front of tylus ; basal antennal segment strongly thickened and much thicker than remaining segments, densely, setosely pubescent.
A small family of medium sized bugs formerly placed in the Coreid tribe Stenocephalini and related to the Lygaeidae . . . STENOCEPHALIDAE Dallas, 1852

— Juga rarely acuminate and extending in front of tylus, if so, never contiguous at base in front of tylus ; basal antennal segment not greatly thicker than remaining segments, pubescence sparse and non-bristly.
A large family of small to medium bugs mainly dull in colour but with one subfamily (Lygaeinae) brightly coloured . . . . LYGAEIDAE (Schilling), 1829

Keys are given below of the subfamilies where such exist. Many families have not, so far, been subdivided.

KEY TO SUBFAMILIES OF HYDROMETRIDAE

1. Antennae 5-segmented ; metasternum with 1 or 2 omphalia ; size small 3–5 mm. . 2

– Antennae 4-segmented ; metasternum without omphalia ; size 6 mm. or more
HYDROMETRINAE Esaki, 1927

2. Head broadly constricted behind the eyes, with 2 black ocellar spots ; the hind lobe with posterior pair of trichobothrial setae inserted on prominent rounded elevations ; anterior lobe of head with 2 pairs of erect, stiff bristles ; metasternum with 2 separate omphalia on posterior margin, front wings with 3 closed cells.
Terrestrial species . . . . . . HETEROCLEPTINAE Villiers, 1948
(= HYDROBATODINAE China & Usinger, 1949)

– Head subcylindrical behind eyes, without ocellar spots, posterior pair of trichobothrial setae inserted on small tubercles at extreme base of head ; only 1 pair of erect stiff bristles in front of eyes ; metasternum with a median single omphalium on posterior margin, front wings with 2 closed cells . LIMNOBATODINAE Esaki, 1927

KEY TO SUBFAMILIES OF MESOVELIIDAE[1]

1. Head elongate slightly declivous towards apex ; antennae inserted well in front of anterior margin of eyes ; posterior margin of eyes not contiguous with anterior margin of pronotum
Scutellum not simple and triangular 2

– Head short, strongly declivous ; antennae inserted close to anterior margin of eyes ; posterior margin of eyes contiguous with anterior margin of pronotum ; scutellum simple, triangular rather shorter than broad at base.
S. American species . . . . . . MESOVELOIDEINAE subfam. nov.
(Usinger in press)

2. Pronotum (macropterous form) extending posteriorly to cover scutellum which is apparently absent (as in Veliidae) ; hemelytra with the corium not differentiated from the membrane, the whole with 6 closed cells ; apterous form unknown.

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[1] Prof. R. L. Usinger has advised us that the structure of the neanides in these three groups is so similar that they should all be regarded as subfamilies of Mesoveliidae.

Terrestrial species in moss on bark of trees near water ; restricted to California MACROVELIINAE McKinstry, 1942

– Pronotum (macropterous form) not as above ; scutellum distinctly visible (macropterous forms) consisting of 2 lobes, the basal one convex the apical one spatulate ; membrane of hemelytron without cells, often completely broken off leaving only a narrow corium ; ocelli present in macropterous form, obsolescent or absent in apterous form which is common.

Small but world-wide subfamily of small surface bugs living on floating vegetation . . . . MESOVELIINAE Douglas & Scott, 1867

KEY TO SUBFAMILIES OF VELIIDAE

1. Tarsal formula 2 : 3 : 3, the basal segments of tarsi of anterior and posterior legs very short, and inconspicuous ; of median legs long, subequal to apical segments ; hemelytra divided by a straight line into corium and membrane ; the corium with 2 closed cells ; membrane broad and long without veins PERITTOPINAE China & Usinger, 1949

– Tarsi not as above ; hemelytra not divided into distinct corium and membrane, with 4–5 closed cells 2

2. Median tarsi deeply cleft, with laminate claws and plumose hairs arising from base of cleft . . . . RHAGOVELIINAE China & Usinger, 1949

– Median tarsi not deeply cleft, without plumose hairs arising from base of cleft . 3

3. Tarsal formula[1] 1 : 2 : 2 4

– Tarsal formula 2 : 2 : 2 or 3 : 3 : 3 5

4. Claws all terminal ; hemelytra with 5 closed cells, the extra cell located along costal margin . . . . HEBROVELIINAE Lundblad, 1939

– Claws preapical ; hemelytra with 4 closed cells MICROVELIINAE China & Usinger, 1949

5. Tarsal formula 2 : 2 : 2 : 2 : very small 1·5–2·5 mm.; suboval usually apterous, macropterous forms unknown.

Marine bugs along coral shores, Indian and Pacific Oceans HALOVELIINAE Esaki, 1930 (Haloveliidae Poisson, 1956)

– Tarsal formula 3 : 3 : 3, basal segment usually short ; larger 4–10 mm. elongate usually macropterous ; mesonotum largely concealed by pronotum in macropterous forms . . . . VELIINAE China & Usinger, 1949

KEY TO THE SUBFAMILIES OF SALDIDAE

1. Scutellum transverse, much broader than long, narrowly arcuate ; eyes small, inner margins entire ; ocelli absent ; hemelytra always abbreviated, the apical margins concave with the outer angle produced ; pronotum quadrate.

In rock crevices and under sea-weed in lowtide zone of rocky seashore. S.W. Europe . . . . AEPOPHILINAE[2] (Puton), 1879

– Scutellum large triangular at least as long as broad, rarely (*Omania*) broader than long but never narrowly arcuate. Eyes large, usually with inner margin sinuate ; ocelli always present, often placed close together ; hemelytra never abbreviated with apical margin concave ; pronotum more or less trapezoidal 2

2. Pronotum with two erect conical tubercles or spinous processes ; head and pronotum narrow, inner margins of eyes parallel, not emarginate.

A small subfamily of very small Saldids distributed in Florida, Formosa and Philippines . . . . SALDOIDINAE Reuter, 1912

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[1] Tarsal formula is number of tarsal segments of anterior, median and posterior legs placed in that order.

[2] Obviously evolved from Saldidae (see China, 1927, *Ent. mon. Mag.* **63** : 238–241) but we do not agree with Leston that this group, hitherto regarded as a distinct family, should be sunk as a tribe of Saldinae.

– Pronotum without tubercles or spinous processes; head wider, pronotum trapezoidal; inner margins of eyes usually emarginate.
A large subfamily of small to medium sized littoral bugs of world-wide distribution SALDINAE Van Duzee, 1917

KEY TO SUBFAMILIES OF GERRIDAE

1. Abdomen elongate, more than twice as long as broad at base; internal margin of eyes concavely emarginate 2
– Abdomen very short, often shorter than wide at base, never more than twice as long as broad at base; internal margin of eyes not concavely emarginate 3
2. Median and posterior legs with tibiae and tarsi very long and slender tapering to apex, thread-like, the tarsi 1-segmented and very short; median tibiae in male with a fringe of long thin hairs.
Medium to large water skaters living on surface of running water PTILOMERINAE Esaki, 1927
– Median and posterior legs with tibiae and tarsi only moderately slender, not tapering to apex nor thread-like, the tarsi long, 2-segmented with the basal segment much longer than the apical segment.
Medium to large water skaters living on both stagnant and running water GERRINAE Bianchi, 1896
3. Apical abdominal segments cylindrical, elongate; head produced in front of eyes so that it is about as long as broad between eyes, sides more or less parallel in front of eyes.
Small water skaters often with curiously modified antennae and legs RHAGADOTARSINAE Lundblad, 1933
– Apical abdominal segments not cylindrical or elongate, usually strongly transverse and retracted; head transverse, triangular, not strongly produced in front of eyes, sides strongly convergent to apex 4
4. Abdomen hardly extending beyond the apices of the posterior coxae, the segments fused and indicated only by the presence of spiracles at sides; male genital segment folded ventrally to lie with its apex directed towards the head.
Minute marine bugs with relatively short robust legs living on isolated coral reefs in the Pacific and Indian Oceans . . HERMATOBATINAE Coutière et Martin, 1901
– Abdomen usually extending distinctly beyond the apices of posterior coxae, the segments not fused and the male genital segments backwardly porrect, not folded ventrally with apex pointing towards head.
Small to medium sized water skaters some genera of which (*Halobates*) are fully marine . . . . HALOBATINAE Bianchi, 1896

KEY TO SUBFAMILIES OF CORIXIDAE

1. Scutellum exposed, covered by pronotum only at anterior margin 2
– Scutellum covered by pronotum rarely with apex visible 3
2. Ocelli present; antennae 4-segmented; anterior tarsal claw large.
Small Australasian water bugs probably living in temporary pools of water judging by the presence of ocelli . . . DIAPREPOCORINAE Lundblad, 1928
– Ocelli absent; antennae 3-segmented; anterior tarsal claw in ♀ spine-like, in ♂ flattened and capable of being folded back into an excavation on the outside of the tarsus.
Small shallow-water bugs of world-wide distribution MICRONECTINAE Jaczewski, 1924
3. Hemelytra with an embolar groove along costal margin 4
– Hemelytra without an embolar groove. Long narrow corixids living in River Nile and its tributaries in Sudan . . . . . STENOCORIXINAE Hungerford, 1948

4. Rostrum with transverse sulcations; nodal suture, towards apex of embolium, present . . . 5
– Rostrum without transverse sulcations; nodal suture absent.
  Small corixids inhabiting ponds and swamps . . . CYMATIINAE Walton, 1940
5. Infra-ocular part of the genae very broad; lower margin of eye concave; hypo-ocular suture arising near the subacute production of the inferior angle of the eye.
  Small tropical-American corixids . . . HETEROCORIXINAE Hungerford, 1948
– Infra-ocular part of the genae usually not broad, if so the hypo-ocular suture, if present, arising about midway along ventral margin of eye.
  Small to medium sized corixids of world-wide distribution and living in ponds, lakes and rivers . . . . CORIXINAE Douglas & Scott, 1865

KEY TO SUBFAMILIES OF HELOTREPHIDAE

1. Adult tarsal segmentation 3–3–3; dorsal surface of head separated from ventral surface by a distinct but fine carina, scutellum much broader at base than long in middle; female with subovipositor.
  Small water bugs living in pot holes in mountain streams in S. America
  NEOTREPHINAE China, 1940
– Adult tarsal segmentation 1–1–2; dorsal surface of head not separated from ventral surface by a distinct carina (if so scutellum much longer than broad), scutellum at least as long as broad; female without an ovipositor 2
2. Body flattened; suture between head and pronotum absent; antennae, 1-segmented (plate-like).
  Minute water bugs from Lake Tanganyika in E. Africa IDIOCORINAE Esaki & China, 1927
– Body strongly convex; suture between head and pronotum distinct; antennae 2-segmented.
  Small semi-globular water bugs living in still water and lakes in the Oriental and Ethiopian Regions . . . . HELOTREPHINAE Esaki & China, 1927

KEY TO SUBFAMILIES OF NEPIDAE

1. Head across eyes distinctly narrower than the anterior margin of pronotum; pronotum broad trapezoidal; anterior coxae short; anterior femora strongly thickened.
  Medium to large water bugs usually living on the bottom of shallow water along the margins of ponds and streams . . . NEPINAE Douglas & Scott, 1865
– Head across eyes distinctly broader than the anterior margin of pronotum; pronotum elongate, cylindrical, widened posteriorly; anterior coxae long and slender; anterior femora not strongly thickened.
  Medium to large water bugs living amongst water plants in deeper water of ponds and lakes . . . . RANATRINAE Douglas & Scott, 1865

KEY TO SUBFAMILIES OF NAUCORIDAE

1. Head narrow, elongate produced in front of eyes; rostrum slender and at least as long as front femora; antennae extending beyond side margins of head and hence visible from above; the anterior tarsi mobile and with 2 well developed claws . 2
– Head broad transverse, not or very slightly produced in front of eyes; rostrum very broad at base tapering towards apex; much shorter than anterior femora; antennae short completely concealed below margins of head; anterior tarsi more or less fused to tibiae (connate) and immobile, usually with 1 or 2 small claws . 3
2. Rostrum very long, reaching at least the median coxae, apical segment much shorter than the penultimate segment; anterior tarsi with 3 segments the basal segment very small and obscure; spiracles visible but apparently closed and surrounded by a rosette of radiating branches; male genitalia asymmetrical; medium sized water bugs usually brachypterous, (the macropterous forms rare), living

on the bed of swift flowing rivers, their plastron respiration enabling them to stay submerged throughout their life.

Distribution throughout the Old World . . APHELOCHEIRINAE Fieber, 1860

– Rostrum short, reaching the anterior coxae only, last 2 segments subequal in length; anterior tarsi with 1-segment only ; spiracles obsolete ; male genitalia symmetrical.

Minute water bugs living in S. American rivers ; so far only macropterous forms are known although in the genus *Coleopteroides* the hemelytra are without a membrane . . . . POTAMOCORINAE Usinger, 1941

3. Anterior margin of pronotum deeply emarginate, head strongly inserted . . 4

– Anterior margin of pronotum straight or feebly emarginate, head not strongly inserted 6

4. Rostrum arising from a deep excavation on under side of head far from its anterior margin ; head convexly and laminately produced in front of eyes ; labrum usually much reduced.

Medium sized water bugs of Oriental distribution
CHEIROCHELINAE Montandon, 1897

– Rostrum arising from anterior margin of head ; labrum distinct and well developed 5

5. Propleura produced laminately over posterior region of prosternum, contiguous medially and completely covering this area of the prosternum ; ventral surface of abdomen densely pubescent, the circumspiracular areas glabrous and a transverse row of small glabrous areas behind each spiracle ; always macropterous.

Medium sized species, distributed in the Neotropical and Nearctic Regions
AMBRYSINAE Usinger, 1941

– Prosternum completely exposed, separated from the flattened pleura by simple sutures and not at all produced medially ; venter of abdomen without pubescence with a perforated disk-like area near each spiracle ; strongly dimorphic ; brachypterous form most common and elongate oval in form.

Medium sized species inhabiting waterfalls in the Neotropical and Mexican Regions . . . . CRYPHOCRICINAE Montandon, 1897

6. Anterior tarsi with 2 segments, with 2 claws which are often inconspicuous, anterior margin of head strongly turned downwards and backwards, the rostrum thus arising well behind the anterior margin of the head ; gular region very short ; median and posterior femora each with 2 longitudinal rows of conspicuous bristles on lower surface in addition to the 2 usual rows of short bristles along the inner (posterior) surface.

Medium sized Naucorids occurring in a wide variety of aquatic habitats and widely distributed in both Old World and New World tropical regions
LACCOCORINAE Stål, 1876

– Anterior tarsi with 1 segment, with or without a minute scarcely distinguishable claw ; anterior margin of head usually less strongly backwardly declivous ; gular region moderately long, median and posterior femora without distinct additional rows of bristles 7

7. Inner margin of eyes anteriorly divergent ; meso- and metasterna with prominent longitudinal carinae which are broad and foveate or otherwise excavate along middle ; body broadly oval and subflattened.

Medium sized Neotropical Naucorids . . . . LIMNOCORINAE Stål, 1876

– Inner margins of eyes anteriorly convergent ; meso- and metasterna at most with small thin plate-like carinae, these sometimes absent ; body strongly convex ; robust species.

Medium sized Naucoridae of cosmopolitan distribution . . NAUCORINAE Stål, 1876

KEY TO SUBFAMILIES OF GELASTOCORIDAE

1. Pronotum with lateral margins subparallel, feebly convex, anterior margin behind vertex straight ; head partly sunk beneath anterior margin of pronotum, eyes

prominent but not pedunculate ; anterior tarsus and claw fused to form a single claw.

Medium sized shore bugs living in muddy situations sometimes a long way from water. Distribution world-wide in tropical and subtropical regions MONONYCHINAE Fieber, 1851

– Pronotum with lateral margins strongly sinuate the widest part about the middle, anterior margin also sinuate ; head not sunk beneath anterior margin of pronotum, eyes extremely prominent and raised, pedunculate ; anterior tarsus with 2 distinct claws.

Medium sized shore bugs (toad bugs) inhabiting sandy and muddy shores of ponds and streams in the Neotropical Region only . GELASTOCORINAE Champion, 1901

KEY TO SUBFAMILIES OF NOTONECTIDAE

1. Hemelytral commissure without a pit (sensory organ) at anterior end ; median femur with a subapical spur on its posterior margin ; antennae with 4 well defined segments ; male genitalia symmetrical.

Cosmopolitan water bugs (back swimmers) . . . NOTONECTINAE Leach, 1815

– Hemelytral commissure with a pit. Median femur without a subapical spur ; antenna with 3 well defined segments.

Tropical and subtropical water bugs (back swimmers) ANISOPINAE Hutchinson, 1929

KEY TO THE SUBFAMILIES OF REDUVIIDAE[1]

1. Anterior coxae elongate at least 4 times as long as wide ; front legs often raptorial . 2

– Anterior coxae not elongate seldom more than twice as long as wide (*Evonymus*) in which case front tibiae with an apical spur and process of trochanter blunt not spine-like and ocelli placed close together ; front legs never truly raptorial . . 5

2. Anterior coxal cavities opening straight downward ; underside of head with downwardly projecting spines and rostrum with upwardly projecting spines or bristles 3

– Anterior coxal cavities opening forward and downward ; head and rostrum without such spines and bristles 4

3. Head with a distinct transverse furrow ; pronotum usually spined ; body not highly polished. Small to medium sized species of world-wide distribution. Biology unknown but nocturnal in habit . . . . SAICINAE (Stål), 1859

– Head without a transverse furrow ; pronotum without spines ; head and body highly polished ; legs relatively long and slender. Only a single genus of small dark coloured, shining species probably inhabiting the forest canopy in Ethiopian and Oriental regions . . . . VISAYANOCORINAE[2] Miller, 1952

4. Ocelli absent ; the lower anterior border of prothorax, seen in side view, scarcely produced beyond upper margin on which head is inserted. Large group of small to fairly large, fragile but predatory species, sometimes bacilliform, sometimes gnat-like ; distribution world wide ; sometimes found in caves and associated with spider webs. Probably prey on Diptera . . EMESINAE (Amyot & Serville), 1843

– Ocelli present ; the lower anterior border of the prothorax produced distinctly beyond the upper border in the middle of which the head is inserted. Small group of genera allied to Emesinae but no ecological data available ; distribution Neotropical . . . . BACTRODINAE (Stål), 1866

5. Rostrum with 4 visible segments, the basal segment distinct. A small family of robust, spiny bugs of Oriental and Malayan distribution

CENTROCNEMINAE Miller, 1956

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[1] Carayon, Usinger and Wygodzinsky (1958, q.v.) do not accept all these subfamilies and would relegate some of them to tribal status.

[2] Although we agree with Villiers (1958) that *Visayanocoris* Miller 1952 is a synonym of *Carayonia* Villiers 1951, we are not convinced that it belongs to the Saicinae and therefore Miller's subfamily name is retained.

– Rostrum apparently 3 segmented, the basal segment not distinctly visible . . . 6

6. Anterior tarsi strongly reduced, either minute or obsolete, rarely robust and distinct (Ectinoderinae) in which case the anterior claws are minute and parallel; the front tibiae are usually distinctly longer than the femora; anterior tibiae often clothed with dense erect pubescence 7

– Anterior tarsi not strongly reduced, never obsolete; anterior claws seldom minute and parallel; front femora seldom longer than tibiae; anterior tibiae not as above 9

7. Pronotum strongly backwardly produced to cover all or most of the scutellum; prosternal stridulatory furrow absent; anterior tarsus usually 1-segmented. . . 8

– Pronotum not backwardly produced, scutellum entirely visible; prosternal stridulatory furrow present. Anterior tibiae with a dorsal sulcus apically in which the 2- or 3-segmented tarsus is carried at rest: head and body and legs somewhat densely setose; females sometimes with a coloured foliaceous process on each side of the eighth dorsal abdominal segment; stridulatory furrow present.

A small group of genera of Neotropical distribution allied to the next two subfamilies but less specialized. Habitat: foliage and flowers associated with forest clearings . . . . APIOMERINAE (Amyot & Serville) 1843

Note. Some species use resin on the front legs to capture prey and this is the most primitive of the two groups in which this curious habit appears to have started.

8. Scutellum entirely invisible, the posterior margin of the pronotum entire; pronotum not flattened; anterior tarsus probably 1-segmented but usually missing in museum specimens; apex of front tibiae curved downwards.

A very small group of medium to small sized species from Central Africa and Madagascar, living under bark and amongst leaf debris . DIASPIDIINAE Miller, 1959

– Scutellum not entirely invisible, its apex visible beyond the medially excavate posterior margin of the pronotum; pronotum strongly flattened; the small anterior tarsi one-segmented. A small group of moderately large to medium sized species of Oriental distribution found on the trunks of jungle trees which exude resin.

Note. The bugs dip their front legs into the sticky resin and use them to catch small bees, etc. Resin is often found on the front legs of museum specimens ECTINODERINAE (Stål), 1866

9. Anterior tarsus with 2 segments; underside of head not spinous 10

– Anterior tarsus with 3 segments, rarely with basal segment very short and apparently 2 segmented (Rhaphidosominae); rarely 2-segmented (*Nalata*, *Stachyogenus* and *Microlestria*, in which case underside of head armed with spinous tubercles . . 14

10. Scutellum triangular; if not then armed with a long erect spine 11

— Scutellum semi-circular, unspined posterior margin sometimes fringed; antennae, legs and abdomen with abundant serrate or plumose setae; trichome usually present on basal ventral abdominal segments; hemelytra with membrane ample; hind wings reduced. A small group of small to moderate sized bugs often found in association with ants on which they prey and which they are said to anaesthetize with the trichome . . . . . HOLOPTILINAE (Amyot & Serville), 1843

11. Undersurface of head with a distinct buccal groove; antenna with first segment strongly thickened, the remaining segments also distinctly thickened with the apical segment very short; tarsi very short; distinctly Aradid-like in general appearance, not Reduviid-like 12

— Undersurface of head without a distinct buccal groove; antennae not as above; not Aradid-like except *Aradomorpha* (Reduviinae), see note below . . . 13

12. Hind wing cell without hamus; dorsal surface of abdomen with only one pair of scent gland openings; head anteriorly without an interantennal process at apex. A small group, of doubtful Reduviid affinity, based on a single genus of neotropical distribution . . . . PHIMOPHORINAE (Handlirsch), 1897

Note. Phimophorus was associated by Handlirsch (1897) with the Stenopodinae, by Wygodzinsky (1948) with the Phymatidae and the genus *Aradomorpha* (Reduviinae). In spite of the absence of a buccal groove *Aradomorpha* with its 2-segmented tarsi might be placed in the Phimophorinae which might better be regarded as a distinct family.

— Hind wing cell with a long hamus ; dorsal surface of abdomen with three pairs of scent gland openings ; head anteriorly with an apically falcate inter-antennal process.

Based on a single genus and species from the Solomon Islands. Superficially closely allied to Phimophorinae (see above) . . MEDANOCORINAE Miller, 1956

13. Fossula spongiosa indistinct, apparently absent from apex of anterior tibia ; whole insect smooth and shining with numerous long erect setae, particularly long and dense on hind tibiae which are themselves very long and curved ; anterior tibiae swollen and compressed laterally on apical half with the tarsi very long ; erect scutellar spine very long ; humeral angles of pronotum hemispherically rounded ; posterior lateral angles of connexivum not dentate.

Very small delicate insects, allied to the Salyavatinae, of which only a single specimen, from Borneo, is known . . . . MANANGOCORINAE Miller, 1954

— Fossula spongiosa always present at apex of anterior tibia usually very distinct ; whole insect dull mat, not shining, not strikingly setose ; hind tibiae straight of normal length ; anterior tibiae often widely dilated even to base, the tarsus usually short, sometimes folded back into a groove at the dorsal apex of the tibia ; humeral angles of pronotum usually acute or spined ; posterior lateral angles of connexivum usually acute or dentate . . . SALYAVATINAE (Amyot & Serville), 1843

14. Hemelytral membrane very broad combined with a narrow and elongate corium ; head usually acuminate ; eyes not at all prominent, definitely flattened so that they do not project laterally beyond the lateral margins of the postocular region of the head, sometimes almost contiguous dorsally ; antennophores placed immediately in front of the eyes and always obliquely divergent anteriorly, rarely laminate (*Afrodecius*) in which case the second visible rostral segment is thickened and its inner posterior apical margin produced into a small sub-acute process parallel with the short apical segment, giving a pincer-like appearance ; first antennal segment both thickened and much longer than the head ; ocelli absent ; head, body and veins of corium often very densely tomentose so that actually surface is invisible.

A small group of medium sized bugs, dull coloured, nocturnal species living among leaf debris and in crevices. Oriental, Australasian and Ethiopian Regions
TRIBELOCEPHALINAE (Stål), 1866

— Hemelytral membrane not very broad combined with a narrow and elongate corium ; eyes not flattened, usually distinctly prominent beyond lateral margins of postocular region of head, never almost contiguous dorsally ; antennophores never obliquely divergent anteriorly nor laminate ; first antennal segment often longer than head but never strongly thickened as well ; head body and veins of corium sometimes tomentose but never so densely that surface is invisible. . . . 15

15. Scutellum triangular, apex sometimes bifid (Hammacerinae) 16

— Scutellum not triangular, apically truncate and mucronate, that is with two or three curved prongs.

A large group of small to medium, often shining, brightly coloured species. Habitat amongst vegetable debris under stones and logs ; mainly nocturnal. World wide distribution in tropical and subtropical regions
ECTRICHODIINAE (Amyot & Serville), 1843

16. Ocelli absent ; hemelytra present 17

— Ocelli present, absent only in apterous specimens 18

17. Head with the postocular region much longer than the anteocular region, the latter ending apically in a stout spine-like process ; pronotum constricted behind the middle ; anterior femora strongly swollen ; tarsi long and slender ; insect not bristly.

A small group of Neotropical and Ethiopian distribution of which probably only *Vescia* and *Chopardita* are typical (see China and Usinger 1949) VESCIINAE Fracker & Bruner, 1924

— Head with the postocular region not longer than the anteocular region, the latter not ending in a spine like process; pronotum constricted at or near middle; anterior femora not especially swollen; insect covered with bristle-like hairs. A very small family of two genera, *Chryxus* and *Lentia* of neotropical distribution CHRYXINAE Champion, 1898

18. Second antennal segment multi-pseudosegmented (8–28). A small family of moderately large, apparently subcorticolous species of Neotropical distribution HAMMACERINAE

— Second antennal segment not multi-segmented 19

19. Head with an apically truncate process between the antennae; the eyes pedunculate; auxilliary postero-lateral, metathoracic scent glands (Brindley's glands) present. A small group of Cicindelid-like reduviids living mostly under logs and stones. Distribution Ethiopian and Neotropical Regions . . CETHERINAE Jeannel, 1919

— Head without such a process; the eyes not pedunculate; Brindley's glands absent 20

20. Head with the transverse sulcus between or behind the eyes absent or obsolescent; anterior and posterior lobes of pronotum indistinctly separated, the former much shorter than the latter 21

— Head with the transverse sulcus between or behind the eyes present and usually distinct; rarely (some Physoderinae) very wide and shallow or rather indistinct (Piratinae) 22

21. Head not extending beyond eyes, strongly deflexed anteriorly; antennae inserted close together between the eyes which are very large and sub-spherical; ocelli placed close together on a strongly elevated protuberance; rostrum short and straight relatively slender with second visible segment very long, lying between the almost contiguous eyes.

A very small group of superficially Triatoma-like bugs of Neotropical distribution. Biology unknown . . . . SPHAERIDOPINAE (Amyot & Serville), 1843

— Head extending well beyond eyes, not deflexed anteriorly; antennae inserted on the sides of the anteocular region of the head in front of middle of anterior margin of eyes; ocelli not placed close together on a protuberance; rostrum long and straight not particularly slender, first visible segment much longer than in Sphaeridopinae; eyes not nearly contiguous on underside of head. The prosternal stridulatory furrow is absent in *Linshcosteus* Dist. Moderately large insects associated with mammals and birds whose blood they suck. Some species are vectors of *Trypanosoma cruzi*, Mostly neotropical or subtropical but one species is tropicopolitan . . . . TRIATOMINAE Jeannel, 1919

22. Hemelytra with cubital nerve branching to form an additional 4 to 6-angled cell between corium and membrane 23

— Hemelytra with cubitus simple not forming such a cell, cubitus sometimes obsolete . 28

23. Cubital cell usually hexagonal, first antennal segment stout, porrect; abdomen with only two dorsal scent glands; claws simple. A fairly large group of rather elongate rather pallid reduviids inhabiting secluded spots in all the Zoogeographical Regions . . . . . STENOPODINAE (Amyot & Serville), 1843

— Cubital cell usually quadrangular, sometimes very small; first antennal segment usually relatively slender; abdomen with three dorsal scent glands; claws dentate or appendiculate 24

24. Rostrum slender and straight, rarely slightly curved at base, either cylindrical, of equal thickness throughout, or swollen at base and tapering gradually to a long fine point; usually extending to the anterior coxae but sometimes (*Phonolibes*) extending almost to the base of abdomen 25

— Rostrum not slender and straight, usually distinctly curved from base to apex and strongly curved at base.

A large group of variable reduviids living on flowering plants, grasses and shrubs in all the Zoogeographical Regions . . HARPACTORINAE (Amyot & Serville), 1843

25. Narrow elongate, often bacilliform species with the transverse head sulcus running between the very small eyes ; usually apterous with long slender legs and short, curved, apparently 2-segmented tarsi ; if not apterous then ocelli situated very close to eyes and far from base of head.

A small group of Old World reduviids living mainly in grasses and low herbage RHAPHIDOSOMINAE Jeannel, 1919

— Not elongate or bacilliform ; transverse head sulcus behind the eyes which are not very small ; macropterous species, the legs seldom exceptionally long and slender 26

26. Head anteriorly acuminate, elongated in front of antennophores so that the subspherical basal lobe bearing the ocelli is very much shorter than the region in front of the eyes ; eyes relatively small ; pronotum smooth with a median longitudinal sulcus ; body tomentose. A small group of Old World species living mainly under logs and stones ; sometimes found in termites' nests PHONOLIBINAE Miller, 1952

— Head not as above, basal lobe bearing ocelli not subspherical and not much shorter than the antiocular region ; eyes relatively large 27

27. Pronotum shining with two percurrent, sinuate, dorso-lateral carinae ; pronotum posteriorly without a flat tongue-like process on each side of scutellum ; hind femora nodular with dense short, erect, glandular setae ; scutellum with a sub-erect thickened process or knob.

A very small group of medium sized species usually with abundant secretory hairs or setae. Habitat jungle trees and foliage in the Oriental and Australasian Regions ; also recorded as predators of termites . . TEGEINAE (Villiers), 1948

— Pronotum dull without percurrent carinae ; pronotum posteriorly with a flat, tongue-like process projecting posteriorly on each side of scutellum ; the scutellum with an apical, spatulate process ; anterior lobe of pronotum usually broader than posterior lobe, the anterior lateral margins broadly rounded ; sometimes with the posterior lobe widest in which case the transverse furrow behind the eyes is very broad and shallow and consequently indistinct ; legs short and thick, femora tuberculate. A small group of reduviids found mainly in rotting vegetable debris and predators on beetles in the Oriental and Mascarene Regions PHYSODERINAE Miller, 1954

28. Pronotum constricted well behind the middle ; anterior coxae large, somewhat laterally compressed and flattened on outer side ; anterior femora usually incrassate.

A small group of mostly dark coloured, terrestrial species of world-wide distribution PIRATINAE (Stål), 1859

— Pronotum constricted about middle ; anterior coxae not especially large nor outwardly flattened ; anterior femora not or only feebly incrassate. A medium sized group of nocturnal mainly terrestrial species found amongst leaf debris, in rocky places and in houses, sheds and poultry houses. Distribution Cosmopolitan REDUVIINAE (Amyot & Serville), 1843

KEY TO THE SUBFAMILIES OF PHYMATIDAE

1. Anterior tarsus 2-segmented, articulating normally with tibia and non-raptorial THEMONOCORINAE[1] (Carayon, Usinger & Wygodzinsky), 1958

– Anterior tarsus fused with tibia and the two together articulating with femur to form a raptorial organ 2

2. Scutellum short not longer than broad, membrane of hemelytra with numerous veins extending from basal cells . . . . PHYMATINAE (Dohrn), 1859

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[1] Carayon, Usinger and Wygodzinsky (1958) regard this group as annectent between Reduviidae and Phymatidae, sinking the latter to subfamily status under the Reduviidae and giving *Themonocoris* tribal status in the Phymatinae (our Phymatidae). To us it is a primitive Phymatid and should not be allowed to disrupt this very concise group.

– Scutellum longer than broad at base, often extending to apex of abdomen, rarely short and only slightly longer than wide at base in which case hemelytral membrane with not more than 5 longitudinal veins 3

3. Anterior legs with the apex of femur on the posterior side extended into a long process beyond the insertion of the tibia-tarsus, so that the femoral process and the tibia act as a pincer ; head and pronotum spinous ; hind wing without a hamus CARCINOCORINAE Handlirsch, 1897

– Anterior legs as in Phymatinae, the femora not apically produced on posterior side but apically strong widened, the tibia-tarsus acting with the broad apex of the femur to form a pincer . . . . MACROCEPHALINAE (Amyot & Serville), 1843

KEY TO THE SUBFAMILIES OF TINGIDAE

1. Head strongly produced in front of insertion of antennae ; bucculae anteriorly produced and posteriorly not extending beyond anterior margin of prosternum ; pronotum posteriorly, obtusely rounded or angulate, rarely truncate and disclosing apex of scutellum ; hemelytra with discal call usually divided by transverse vein or veins into 2 or 3 areas.
   Medium to small species, widely distributed in the Old World CANTACADERINAE (Stål), 1873

– Head not or feebly produced in front of insertion of antennae ; bucculae not produced anteriorly but posteriorly strongly, backwardly produced and reaching anterior coxae ; pronotum posteriorly distinctly angulate ; hemelytra with discal cell entire, transverse veins absent 2

2. Hemelytra with areolations very small ; corium without distinct discoidal and subcostal areas ; pronotum without either a vesiculate hood or lateral paranotal dilations ; costal margin of hemelytra not dilated.
   Very small, narrow, elongate species of world-wide distribution AGRAMMINAE (Douglas & Scott), 1865

– Hemelytra usually with large areolations ; corium with distinct discoidal and subcostal areas ; pronotum usually with a vesiculate hood or hood-like prominence, often with paranotal dilations and with the costal margin dilated.
   Small to medium sized bugs ; cosmopolitan . TINGINAE (Douglas & Scott), 1865

KEY TO SUBFAMILIES OF ARADIDAE

1. Genae reduced, not produced on either side of clypeus to form a cleft apex of head ; 3 equally developed dorsal abdominal scent gland ostioles 2

– Genae large, often surpassing clypeus to form a cleft apex of head ; only 2 distinct dorsal abdominal scent gland ostioles, the first large, the second rarely well developed, the third obsolescent 6

2. Rostrum free at base ; wings deciduous at a line of weakness level with apex of scutellum.
   A small subfamily of strongly flattened, fulvous aradids from Chile, New Zealand, Australia and Tasmania . . . . . . ISODERMINAE Stål, 1872

– Rostrum enclosed by bucculae at base ; wings not deciduous and without the line of weakness 3

3. Metapleuron with a distinct scent gland ostiole in front of posterior coxa . . 4

– Metapleuron without distinct scent gland ostioles 5

4. Scent gland ostiole with a long curved seta ; juga well developed extending on each side of clypeus for nearly half its length.
   A very small subfamily of primitive aradids from Australia, Tasmania and New Zealand . . . . PROSYMPIESTINAE Usinger & Matsuda, 1959

– Scent gland ostiole with a carina curved at apex ; juga reduced.
   A very small subfamily of primitive aradids from New Zealand CHINAMYERSIINAE Usinger & Matsuda, 1959

5. Scutellum large covering nearly all the abdomen ; hemelytra largely hidden and membranous ; edge of connexivum double.
A small subfamily mainly restricted to the Southern Hemisphere
CALISIINAE (Stål), 1873
– Scutellum small, covering only a small area of abdomen ; hemelytra completely exposed often with costal margins dilated at base.
A medium sized subfamily, mainly holarctic in distribution
ARADINAE (Amyot & Serville), 1843
6. Rostrum arising from an open atrium ; anterior dorsal abdominal scent gland ostiole of third segment not or slightly displaced backward.
A small subfamily of cosmopolitan distribution ANEURINAE (Douglas & Scott), 1865
– Rostrum arising from a closed atrium through a longitudinal slit-like opening ; dorsal abdominal scent gland ostiole displaced from third to median or posterior margin of fourth segment 7
7. Metapleural scent gland ostiole inconspicuous ; body more or less covered with a pale incrustation which forms a constant pattern and sometimes entirely obscures the integument . . . . CARVENTINAE Usinger, 1950
– Metapleural scent gland ostiole distinct, placed laterally behind the middle coxa ; usually narrow-elongate with a channel leading from inner end towards the median coxa ; sometimes (Chelonocorini) the metapleural scent gland ostiole is wide with a continuous peritreme that is isolated and without a channel leading to the median coxa ; body sometimes obscured by dirt but without a distinct patterned incrustation . . . . MEZIRINAE Oshanin, 1908

KEY TO THE SUBFAMILIES OF ENICOCEPHALIDAE

1. Pronotum divided into 3 lobes by two distinct transverse furrows. Male pygophor with neither mobile gonopods nor a distinct anal tube . *Enicocephalinae* (Stål), 1860
– Pronotum roundly narrowing from base to apex, not divided by two distinct transverse furrows into 3 lobes. Male pygophor with a pair of mobile gonopods and with a distinct anal tube . . . . . . *Aenictopechinae* Usinger, 1932
This last subfamily was suppressed by Usinger (1943) but has been reinstated by Villiers (1958).

KEY TO THE SUBFAMILIES OF CIMICIDAE

(based on the work of R. L. Usinger)

1. Clypeus narrowed apically ; rostrum very short, not reaching level of insertion of antennae.
A single American genus on cave bats (*Tadarida mexicana*) in North America (Texas) . . . . PRIMICIMICINAE Usinger (in press)
– Clypeus widened apically ; rostrum longer, usually surpassing base of head . . 2
2. Bristles at sides of pronotum serrate on their outer edges ; metasternum widened posteriorly, plate-like between posterior coxae ; organ of Ribaga ventral on fourth or fifth segments of abdomen.
Parasites of bats and birds and man. Cosmopolitan . CIMICINAE Van Duzee, 1916
– Bristles at sides of pronotum not serrate on their outer edges, usually cleft or dentate at tips ; metasternum roundly lobed and more or less compressed between the hind coxae ; organ of Ribaga usually dorsal 3
3. Tibiae with short stout bristles in addition to short hairs.
Bugs predatory on birds including domestic fowl in America
HAEMATOSIPHONINAE Jordan & Rothschild, 1912
– Tibiae with fine bristles which may be short or very long but not stiff and spine-like.
Bugs predatory on bats in the African and Oriental Regions
CACODMINAE Kirkaldy, 1899

KEY TO THE SUBFAMILIES OF ANTHOCORIDAE

1. The hind wing cell with a distinct hamus (hook-like vein) 2

–. The hind wing cell without a distinct hamus.
Small species living under bark . . . DUFOURIELLINAE Van Duzee, 1916

2. Hamus of hind wing cell arising from the vena connectens[1]; the two apical antennal segments slender, filiform.
Small predatory species in litter or stored products . LYCTOCORINAE Reuter, 1884

– Hamus of hind wing cell arising from vena decurrens or from the vena subtensa; the two apical antennal segments fusiform.
Small, phytophaguous and predatory species of cosmopolitan distribution
ANTHOCORINAE Reuter, 1884

Note. The authors had considered the genera allied to *Bilia* Distant, previously placed in the Isometopidae, as forming a new subfamily of Anthocoridae distinguished from the Anthocorinae by the strongly convex margins of the pronotum and hemelytra, deep cuneal fracture and widely spaced ocelli. Carayon's recent paper (1958) in which he associates *Orius* and other genera with *Bilia* and regards the group as merely a tribe (Oriini) of Anthocorinae, has caused them to refrain from establishing such a new subfamily.

KEY TO SUBFAMILIES OF MICROPHYSIDAE

1. Rostrum either apparently 3- or 4-segmented but always with the formula 1, 4, 3, 2 (segments numbered from base to apex and arranged in order of length, shortest first); membrane with distinct venation in males; females with ovipositor present
MICROPHYSINAE China, 1953

– Rostrum apparently 3-segmented (that is first segment invisible), formula either 1, 2, 3, 4, or (*Nabidomorpha*) 1, 2, 4, 3; membrane always without venation; ovipositor absent, female genital opening transverse . PLOKIOPHILINAE China, 1953

KEY TO SUBFAMILIES OF NABIDAE

1. Metathoracic scent gland ostioles not visible between median and posterior coxae; all tarsi 1-segmented; tibiae with curious spatulate process at apex below insertion of tarsi; underside of head with 2 pairs of spines; underside of anterior femora spined as well as the usual bristly pubescence.
A single genus of tropical American species . . CARTHASINAE Blatchley, 1926

– Metathoracic scent gland ostioles distinct between median and posterior coxae, placed nearer to the posterior coxa than to the median; all tarsi 3-segmented, tibiae without an apical spatulate process; underside of head and anterior femora without spines 2

2. Pronotum very strongly convex, laminately extended backwards on each side of base of scutellum; median femora in male incrassate and spined; abdomen narrowed at base; ovipositor reduced; hamus absent in wing.
A single genus of tropical American species living in spider webs
ARACHNOCORINAE Reuter, 1890

– Pronotum not very strongly convex, not laminately extended backwards on each side of base of scutellum, the posterior margin more or less straight; median femora in male not incrassate; abdomen broad not narrowed at base; ovipositor well developed; hamus present in wing 3

3. Anterior coxal cavities closed behind; anterior coxae very long.
A single genus of Oriental and African species . . GORPINAE Reuter, 1909

– Anterior coxal cavities open behind; anterior coxae relatively short . . . 4

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[1] For definition of these terms see Parshley, 1923, *Guide to Ins. of Connecticut*, Part 4, Hemiptera, p. 670, fig. 153.

4. Pronotal collar reduced ; clavus narrowed posteriorly, the commissure shorter than the scutellum.
A small subfamily of rather brightly coloured, terrestrial species
Prostemminae Reuter, 1890

– Pronotal collar broad and distinct ; clavus broadened posteriorly, the commissure longer than the scutellum.
A large group of species inhabiting low vegetation and bushes
Nabinae Reuter, 1890

Key to Subfamilies of Miridae

1. Arolia present, large and free 2
– Arolia absent, substituted by a pair of straight hairs 3
2. Arolia distinctly divergent towards their apices, usually dilated ; pronotal collar always present and well separated from pronotum by a furrow
Mirinae (Amyot & Serville), 1843
– Arolia parallel or convergent toward their apices, usually slender ; pronotal collar if present of the depressed type that is at a lower level than rest of pronotum
Orthotylinae Van Duzee, 1916
3. Pseudarolia present, free or attached to the claw, sometimes minute, in which case pronotal collar absent 4
– Pseudarolia absent, pronotal collar present or if not claws very long smooth and slender 5
4. Pseudarolia arising from the base or inner margin of claw ; membrane with 2 cells ; tarsi linear . . . . Phylinae (Douglas & Scott), 1865
– Pseudaroila arising from the inner surface of claw ; membrane with 1 cell only ; tarsi thickened towards apices . . . Bryocorinae (Douglas & Scott), 1865
5. Claws toothed or thickened at base . . Deraeocorinae (Douglas & Scott), 1865
– Claws not toothed or thickened at base . . . . Cylapinae Kirkaldy, 1903

Key to the Subfamilies of Cydnidae

1. Feebly convex ; scutellum not extending to apex of abdomen ; clavus elongate extending to or almost to the apex of scutellum ; posterior margin of ventral surface of eye extending to posterior margin of ventral side of head ; hind wing without a small hole in the anal lobe behind the second anal vein 2
– Strongly convex ; scutellum extending to apex of abdomen ; clavus visible only as a small triangle on each side of base of scutellum ; posterior margin of ventral surface of eye not extending to posterior margin of ventral side of head ; hind wing often (?) with a small hole in the anal lobe behind the second anal vein
Thyreocorinae Van Duzee, 1907
2. Head usually with distinct spines or bristles, often with an apical marginal fringe of spines or bristles, anterior tibiae broad and flattened. A moderately large subfamily of black or brownish bugs living on the roots of low plants, sometimes with the anterior and posterior legs modified for digging ; pairs of ventral abdominal trichobothria longitudinally arranged and more or less in line with the spiracles
Cydninae (Amyot & Serville), 1843
– Head destitute of spines and bristles, without an apical marginal fringe of spines ; anterior tibiae cylindrical towards base but triangularly dilated apically ; trichobothria in transverse pairs not in line with spiracles
Sehirinae (Amyot & Serville), 1843

Key to the Subfamilies of Urostylidae

1. Corium irregularly punctured on disk ; 5 pairs of abdominal spiracles (3–7) all ventral ; rostrum short, not extending to median coxae ; wing with normal pentato-

moid venation, that is, with *Cu* and antevannal veins complete ; vannals 1 and 2 and jugal vein all present.

Coreid-like bugs confined to the Oriental Region . UROSTYLINAE Dallas, 1851

– Corium unpunctured on disk between the distinct row of punctures along $R + M$ and the row along the claval suture ; 6 pairs of visible abdominal spiracles, second basal and ventral and 3–7 placed on lateral margin of connexivum ; rostrum long, extending to fourth abdominal segment ; wing with apical *Cu*, antevannal, vannals, anal and jugal veins absent.

Known only from a single specimen of a minute species from Borneo SAILERIOLINAE China & Slater, 1956

KEY TO SUBFAMILIES OF PENTATOMIDAE

1. Prosternum with a deep, median longitudinal sulcus, the lateral margins of which (anterior lateralia) are strongly laminately elevated above the basisternum on each side of rostrum ; primary vein ($R + M$) of hind wing remote from subtended vein (*Cu*), the basal cell so formed with a long (complete) hamus vein formed by the passing of M from $R + M$ to *Cu* 2

– Prosternum without a deep, median longitudinal sulcus, lateral margins not strongly laminately elevated on each side of rostrum ; primary vein ($R + M$) of hind wing more or less parallel with *Cu* ; hind wing cell rarely with a hamus (Tessaratominae) in which case the hamus is short (not complete) 4

2. Tarsi 2-segmented ; no veins on hemelytral membrane.

Minute blackish S. American bugs formerly placed in the Cydnid subfamily Thyreocorinae . . . . . . MEGARIDIINAE McAtee & Malloch, 1928

– Tarsi 3-segmented ; at least several strong, longitudinal veins on hemelytral membrane 3

3. Antennae 5-segmented with the second segment very short, much shorter than the first ; anterior margin of pronotum rounded into lateral margins, no anterior lateral angle.

Relatively small, black shining bugs of Neotropical distribution formerly placed in the Cydnidae . . . . CANOPINAE (Amyot & Serville), 1843

– Antennae 5-segmented, the second segment not shorter than the first ; anterior margin of pronotum forming distinct angles with lateral margins.

A large subfamily of bugs, often very highly coloured and frequently metallic although some groups are dull brown in colour. Inhabiting flowering shrubs and trees, also Graminaceae (*Eurygaster*) . . . . SCUTELLERINAE (Leach), 1815

4. Spiracles of second abdominal segment always exposed ; hind wing cell with spur-like (short) hamus.

Mostly large flattened bugs with dilated connexivum, Old World distribution TESSARATOMINAE (Stål), 1865

– Spiracles of second abdominal segment always covered by posterior part of metapleura ; hind wing cell without a spur-like hamus 5

5. Tarsi 2-segmented ; third abdominal segment spinuously produced mid-ventrally ; eighth abdominal segment well developed, not ring like ; meso-sternum medially longitudinally carinate ; mostly phytophagous but some species have been recorded feeding on carrion.

Widely distributed . . . . ACANTHOSOMATINAE (Stål), 1864

– Tarsi 3-segmented very rarely 2-segmented ; third abdominal segment not spinously produced midventrally ; eighth abdominal segment reduced to a ring and concealed ; mesosternum not carinate. 6

6. Rostrum very short, not extending beyond anterior coxae ; basal segment and a large part of segment 2 concealed within bucculae. Somewhat elongate or elliptical bugs with head acute anteriorly, the juga in some species being separated.

Found on low plants and Graminaceae. Ethiopian, Oriental and Australian Regions . . . . PHYLLOCEPHALINAE Dallas, 1851

– Rostrum not very short ; 7

7. Basal segment of rostrum very thick.
Predacious bugs distributed in all Zoogeographical Regions
ASOPINAE Spinola, 1850

– Basal segment of rostrum not thick 8

8. Antennae with 4 segments ; pronotum and connexival segments with lateral foliaceous or thickened expansions 9

– Antennae with 5 segments sometimes with 4 (Dinidorinae) ; pronotum and connexival segments without foliaceous or thickened expansions 11

9. Bucculae obsolescent, shorter than basal rostral segment ; scutellum short, as long as wide.
One species known at present from Malaysian subregion ; habits unknown
SERBANINAE Leston, 1953

– Bucculae distinct, as long as basal rostral segment ; scutellum longer than wide . 10

10. Basal antennal segment moderately long, slender ; scutellum large with strong spine or projection arising from middle ; scutellum covering part of abdomen.
A small subfamily of somewhat small dull Neotropical bugs
CYRTOCORINAE Distant, 1880

— Basal antennal segment short, thick ; scutellum much longer than wide without median spine or projection and not covering part of abdomen.
Subfamily containing few species distributed in the Oriental Region ; found mainly in damp situations . . . . . EUMENOTINAE Esaki, 1922

11. Bucculae closed posteriorly,; hemelytral membrane reticulate ; antennae 4-segmented, sometimes 5-segmented in which case hemelytral membrane usually reticulate.
Mostly dull coloured bugs of wide distribution . . DINIDORINAE Stål, 1870

— Bucculae open posteriorly ; hemelytral membrane not reticulate ; antennae 5-segmented 12

12. Tibiae sulcate on outer surface ; basal rostral segment longer than bucculae ; scutellum variable in size, mostly longer than wide, very rarely concealing abdomen and hemelytra.
Large subfamily living on a wide variety of plants ; often of economic importance. Distribution world-wide . . . PENTATOMINAE (Amyot & Serville), 1843

— Tibiae not sulcate on outer surface ; basal rostral segment not longer than bucculae ; scutellum longer than wide, often covering entire abdomen and hemelytra except corium.
Somewhat small dark coloured bugs, some of which are of economic importance. Distributed in Oriental, Australian, Ethiopian, Palaearctic or Nearctic Regions
PODOPINAE (Amyot & Serville), 1843

KEY TO SUBFAMILIES OF THAUMASTOCORIDAE

1. Pseudarolia absent ; apex of tibia bearing a lobate sensory appendage ; males with 1 harpago present ; pygophore with a lateral projection ; apex of corium not extending almost to apex of membrane.
Distributed in Australia and Southern India . THAUMASTOCORINAE Kirkaldy, 1908

– Pseudarolia present ; apex of tibiae without a lobate sensory appendage ; males without harpagones ; pygophore lacking a lateral projection ; apex of corium extending almost to apex of membrane. Known species feed on developing leaves of palms.
Distributed in West Indies and South America (Argentine)
XYLASTODORINAE Barber, 1920

N.B. The subfamily Discocorinae Kormilev, 1955, listed on page 8 is regarded by Drake & Slater (1957, *Ann. Ent. Soc. America*, **50** : 368) as a synonym of Xylastodorinae Barber, 1920.

KEY TO SUBFAMILIES OF BERYTIDAE

1. Head elongate with vertex produced above tylus ; peritreme of metathoracic scent glands not produced.
Distributed in Palaearctic, Oriental and Australian Regions BERYTINAE Puton, 1886

– Head short with no process on vertex ; peritreme of metathoracic glands produced.
Distributed in Palaearctic, Oriental, Ethiopian, Nearctic, Neotropical and Australian Regions . . . . . METACANTHINAE Douglas & Scott, 1865

KEY TO SUBFAMILIES OF COREIDAE

1. Apterous species. Spiracles located close to margin of abdomen ; those on segments 2 and 3 marginal and visible from above.
Small dull-coloured Aradid-like Coreids living among vegetable debris on forest floor. Australia . . . . AGRIOPOCORINAE Miller, 1953

– Macropterous or at least brachypterous species ; spiracles ventral, in normal position away from lateral margin 2

2. Metapleural scent gland ostioles distinct, rarely (*Euthetus* and *Stachyocnemus*) obsolete ; fourth and fifth dorsal abdominal segments with basal margin lobately sinuate into preceding segment 3

– Metapleural scent gland ostioles absent ; if not, then ostioles placed between posterior acetabula and usually with 2 divergent sulci ; fourth dorsal abdominal segment medially sinuate at base and apex, or at least at the apex ; corium often hyaline in middle.
Medium to small phytophagous bugs living on low vegetation
RHOPALINAE (Amyot & Serville), 1843

3. Bucculae long, extending posteriorly (in lateral view) beyond the position of insertion of the antennae ; broader and more robust species with shorter and thicker legs ; often strongly sexually dimorphic, the males with posterior legs thickened and armed with spines or spurs 4

– Bucculae small, short not extending posteriorly beyond insertion of antennae, sometimes entirely anterior to antennophores. Narrow, elongate species with relatively long legs ; posterior femora in males often thickened.
Medium sized phytophagous bugs of world-wide distribution living on grasses and leguminous plants . . . . . . ALYDINAE (Amyot & Serville), 1843

4. Posterior tibiae with apex produced below into a tooth or spine ; head small, much shorter and narrower than the thorax.
S. American species . . . . MEROPACHYDINAE (Stål), 1867

– Posterior tibiae unarmed apically, rarely spined, in which case head large or only slightly shorter or narrower than thorax 5

5. Hind wing cell with a distinct hamus ; head in front of eyes without a median sulcus ; tibiae not sulcate on outer surface.
Small, usually setose bugs, Palaearctic, Nearctic, Ethiopian and Oriental regions . . . . PSEUDOPHLOEINAE (Stål), 1867

– Hind wing cell without a hamus ; head in front of eyes with a median sulcus ; tibiae sulcate on outer surface,
Large subfamily comprising a great diversity of forms classified into many tribes and of world-wide distribution. Includes numerous species of economic importance
COREINAE (Stål), 1867

Note. Some of the tribes of the Coreinae are worthy of elevation to subfamily rank.

KEY TO SUBFAMILIES OF LYGAEIDAE

1. Ocelli present 4

– Ocelli absent 2

2. Elongate species with acuminate head and long slender antennae and legs : Brachypterous.
 Transcaucasia . . . . . . PHASMOSOMINAE Kiritshenko, 1938[1]

– Not elongate ; body oblong or elliptical ; head not sharply acuminate at apex ; legs and antennae not slender and elongate 3

3. Eyes large with large facets ; membrane with 3 or 4 veins ; body strongly pilose.
 A single S. American species . . . . LIPOSTEMMATINAE (Berg), 1879[1]

– Eyes small with large facets ; membranal veins obsolescent ; body only with scattered pale hairs.
 An Eremian genus of the Palaearctic Regions . . CAMPTOCERA Jakovlev, 1877 (MEGALONOTINAE)

4. All spiracles situated on dorsal surface of abdomen 5

– All spiracles not situated on dorsal surface of abdomen 8

5. Apical half of corium narrow elongate, apex thickened ; antennae long, the second and third segments long and slender, the basal segment thickened ; ocelli more or less contiguous, connexival segments 5–7 with laminate, horizontal expansion.
 Small subfamily. Oriental Region . . . . MALCINAE (Stål), 1866

– Apical half of corium not narrow elongate, apex not thickened ; antennae relatively short, the second and third segments not very long and slender ; connexival segments 5–7 without laminate horizontal expansions 6

6. Corium shorter than hemelytral membrane ; connexival segments 5–7 laterally elevated ; eyes stylate ; antennophore with a distinct tooth in front of eye.
 Distributed in Ethiopian and Oriental Region . CHAULIOPINAE Breddin, 1907

– Corium not shorter than hemelytral membrane ; veins of membrane distinct ; eyes not stylate ; antennophore without a distinct tooth in front of eye. . . . 7

7. Hemelytra wider than abdomen ; costal margin of corium dilated ; corium distinctly punctate.
 Small species distributed in all Zoogeographical regions . CYMINAE (Stål), 1862

– Hemelytra not wider than abdomen ; costal margin of corium not dilated ; corium not, or very feebly punctate.
 Large subfamily of mostly brightly coloured species ; usually phytophagous ; 1 species recorded as feeding on carrion ; some species of economic importance. Distributed in all Zoogeographical Regions . . . LYGAEINAE (Stål), 1862

8. Third ventral intersegmental suture not extending to lateral margin. Spiracles usually ventral but the basal 3 segments or some of them often with spiracles dorsal . . . . . . MEGALONOTINAE Slater, 1957

– Third ventral intersegmental suture extending to lateral margin 9

9 Spiracles all ventral 10

— Spiracles situated both dorsally and ventrally 11

10. Rostrum not extending to, or only a little beyond anterior coxae ; anterior femora incrassate and spinose on lower surface ; segments 5 and 6 of abdomen mid-ventrally wide ; hamus of basal wing cell arising from the vena subtensa.
 Small subfamily of pale coloured species recorded from the Nearctic, Palaearctic, Sonoran, Ethiopian and Australian Regions . . PACHYGRONTHINAE (Stål), 1865

— Rostrum extending beyond anterior coxae ; anterior femora not incrassate and spinose on lower surface ; segments 5 and 6 of abdomen mid-ventrally very narrow ; hamus of basal wing cell arising from the vena connectens.

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[1] We are not entirely convinced that these are distinct subfamilies and think that they are more likely to be aberrant genera of existing subfamilies as *Camptocera* is of the Megalonotinae. *Phasmosomus* Kiritshenko is remarkably similar in habitus to some of the Alydine Coreidae such as *Stachylobus* Stål and might indeed be an aberrant genus of that group rather than a Lygaeid. *Lipostemmata* Berg also seems likely to be an aberrant genus of Megalonotine Lygaeidae.

Small subfamily of small, somewhat hirsute species, distributed in all Zoogeographical Regions . . . . HETEROGASTRINAE (Stål), 1872

11. Spiracles on segment 2 of abdomen dorsal, on segments 3–7 ventral . . . 12

— Spiracles differently arranged 13

12. Lateral margins of pronotum laminate ; lateral margins of corium not widely laminate.

Small subfamily of small species distributed in Palaearctic Region ARTHENEINAE (Stål), 1872

— Lateral margins of pronotum not laminate ; lateral margins of corium widely laminate.

Moderately large subfamily of small, mostly dull-coloured, somewhat setose phytophagous bugs ; some of economic importance. Distributed in all Zoogeographical Regions . . . . OXYCARENINAE (Stål), 1862

13. All spiracles dorsal, except on segment 7 where they are ventral. Somewhat narrow, elongate, mostly small, flattened species ; head usually narrower than posterior margin of pronotum ; sometimes with anterior tibiae modified for fossorial or raptorial purposes ; brachyptery common.

Moderately large subfamily of mainly phytophagous species ; some species possibly carnivorous ; one known species myrmecophilous. Distributed in all Zoogeographical Regions except Mascarene . . . BLISSINAE (Stål), 1862

— Spiracles differently arranged 14

14. Spiracles on segments 2–4 dorsal ; on segments 5–7 ventral 15

— Spiracles on segment 2 ventral ; on segments 3–5 dorsal, on segments 6 and 7 ventral.

Small species distributed in Palaearctic Region HENESTARINAE (Douglas & Scott), 1865

15. Pronotum longer than wide, with a transverse sulcus near middle ; scutellum as long as wide.

Small, somewhat delicate, elongate, pallid bugs. Recorded only from W. Indies PAMPHANTINAE Barber & Bruner, 1933

— Pronotum wider than long, without a transverse sulcus in middle ; head across eyes very broad ; scutellum longer than wide.

Small, elliptical, more robust species. Distributed in all Zoogeographical regions except Mascarene . . . . GEOCORINAE (Stål), 1862

Note. The subfamily Bledionotina of Reuter (1878, *Ann. Soc. ent. Fr.*, p. 144) has been omitted from this key as we consider *Bledionotis* Reuter to be merely an aberrant genus in the subfamily Megalonotinae.

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BRITISH MUSEUM 14 SEP 1959 NATURAL HISTORY

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BY

N. C. E. MILLER x-ref.

Commonwealth Institute of Entomology, London

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Pp. 47–117; *Plates* 1–4; 92 *Text-figures*

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A NEW SUBFAMILY, NEW GENERA AND NEW SPECIES OF REDUVIIDAE (HEMIPTERA-HETEROPTERA)

By N. C. E. MILLER

In this paper a new subfamily is established and new genera and species of Reduviidae from the Ethiopian, Oriental and Australian Regions are described and figured.

For the loan of types and other specimens of the genus *Tiarodes* which I have revised, I am greatly indebted to Dr. S. von Kéler, Zoologisches Museum, Humboldt Universität, Berlin (*Tiarodes dubius* Reuter) ; Dr. René Malaise, Naturhistoriska Riksmuseet, Stockholm (*T. cruentus* Stål, *T. varicolor* Stål) ; Professor Dr. Sachtleben, Deutsches Entomologisches Institut, Berlin, (*T. frühstorferi* Breddin, *T. waterstradti* Breddin, *T. rabiosus* Miller, *T. nitidus* Miller) ; Dr. H. C. Blöte, Rijksmuseum van Natuurlijke Historie, Leiden (*T. convivus* Miller, *T. serenus* Miller) ; Dr. Eva Halaszfy and Dr. Á. Soós, Hungarian National Museum, Budapest (*T. xanthusi* Reuter).

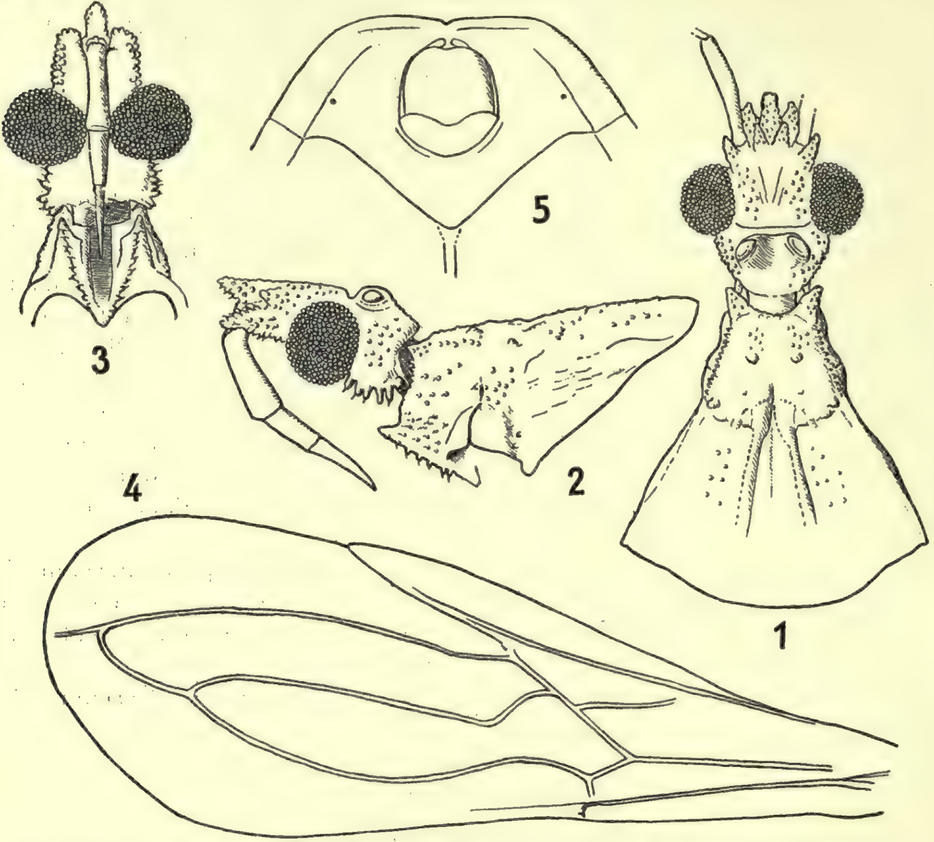
I have also to thank Dr. S. L. Tuxen, Universitetets Zoologiske Museum, Copenhagen, for the photograph of the holotype of *Tiarodes rufithorax* Reuter, and the Photographic Department of the British Museum, Natural History, London, for the photographs of the remaining species of *Tiarodes*.

Except where otherwise stated, holotypes are in the British Museum, (Natural History), London.

Subfamily STENOPODINAE

PARAGYLLA gen. nov.

SIZE. Small. Basal segment of antennae moderately thick, setose, longer than anteocular ; segment 2 longer than basal segment. Head tuberculate, shorter than pronotum ; interantennal projections present ; tylus and bucculae produced anteriorly ; gula flattened ; eyes large, prominent, longer than height of head, narrowly separated at their lower margins ; postocular tuberculate on lower surface laterally ; ocelli large, elevated, widely separated ; vertex wider than an eye ; antennophores equidistant between eyes and apex of head ; rostrum compressed laterally ; basal segment subequal in length to remaining segments together ; segment 3 strongly compressed, acute, longer than segment 2. Anterior pronotal lobe shorter than posterior lobe, laterally tuberculate and with tubercles on disc ; lateral angles of collar produced ; lobe medially, longitudinally sulcate basally ; posterior lobe medially, longitudinally sulcate with a carina on each side of sulcus ; humeral angles feebly produced ; prosternum laterally produced ; sides of stridulatory furrow tuberculate ; mesosternum with an elliptical sulcus ; pronotum, pleura, metasternum, minutely granulose ; scutellum with apex produced and with short, conical projection basally laterally ; disc feebly depressed. Hemelytra extending beyond apex of abdomen ; enclosed cell absent. Legs slender ; anterior tarsi with 2 segments. Abdomen medially excised apically ; midventrally longitudinally carinate, except segment 7 ; segment 8 exposed ; vestiges of dorsal gland ostioles on segments 4, and 5 only (indistinct on 4). Type species, *Paragylla calida* sp. n. Text-figs. 1–5.



FIGS. 1–5. *Paragylla calida* gen. nov., sp. n. (1) Head and pronotum, dorsal view. (2) *Idem*, lateral view. (3) Head and prosternum, ventral view. (4) Hemelytron. (5) Apex of abdomen, ventral view.

Paragylla calida sp. n.

COLOUR. Testaceous with faint reddish suffusion. Head somewhat dark ; scutellum brown. Hemelytral membrane very pale stramineous with infumate suffusion ; metathoracic wings hyaline, whitish.

STRUCTURE. Basal antennal segment feebly curved, somewhat constricted basally; segment 2 about one-quarter longer than basal segment. Tubercles on postocular moderately long, thick, setigerous, fused basally. Tubercles on vertex and bucculae low, rounded. Ocellar interspace medially, longitudinally sulcate, about three times as wide as an ocellus. Space between lower margin of eyes subequal in width to basal rostral segment. Scutellar spine subacute, horizontal. Humeral angles with a short, rounded tubercle.

Total length, 10·50 mm.; hemelytra, 7·50 mm.; greatest pronotal width, 2·50 mm.

One ♂ (holotype), 1 ♂ (paratype), W. Australia, Nicol Bay dist. Dr. Clement (B.M. 1900–220).

Allied to *Agylla* Stål, 1865, *Hem. Afr.* **3** : 150. Differs in having the ocelli widely separated, the eyes narrowly separated at their lower margins, the rostrum somewhat flattened (third segment strongly flattened), segment 2 shorter than segment 3, and in lacking an enclosed cell on the hemelytral membrane at base of internal cell.

DIOKTEROCORIS gen. nov.[1]

SIZE. Small. Basal segment of antennae moderately thick, feebly curved; segment 2 slender; remaining segments filiform; antennophores nearer to apex of head than to eyes; head longer than pronotum; gula flattened; lower lateral margins tuberculate; bucculae produced; tylus feebly elevated; length of eyes less than height of head; surface of head, except gula, granulose; ocelli moderately large, widely separated; postocular somewhat flattened dorsally; basal segment of rostrum longer than remaining segments together; segment 2 with robust setae or spines on outer surface apically. Pronotum wider than long; anterior lobe longer than posterior lobe; lateral angles of collar produced; humeral angles rounded; prosternum produced laterally; scutellum produced apically; postscutellum with an elevation on apical margin medially. Hemelytra extending to apex of abdomen. Anterior femora moderately incrassate, with 2 rows of moderately long, setigerous spines and a few short spines on lower surface; upper surface and laterally with low, setigerous tubercles; anterior tibiae shorter than femora; median and posterior legs slender.

Type species, *Diokterocoris sudanicus* sp. n. Text-figs. 6–9.

Diokterocoris sudanicus sp. n.

COLOUR. Pale testaceous. Head darker and with a brown spot near inner margin of ocelli. Elevation on postscutellum piceous. Apex of corium faintly suffused with brown; discal cell and external cell of membrane with faint infumate suffusion.

Total length, 7·50 mm.; hemelytra, 5·00 mm.; Greatest pronotal width, 1·60 mm.

One ♀ (holotype), Sudan, Taladir, 11.x.1920, Maj. Graham, 1 ♀ (paratype), Mongalla, 6.xii.1917, J. R. Yardley.

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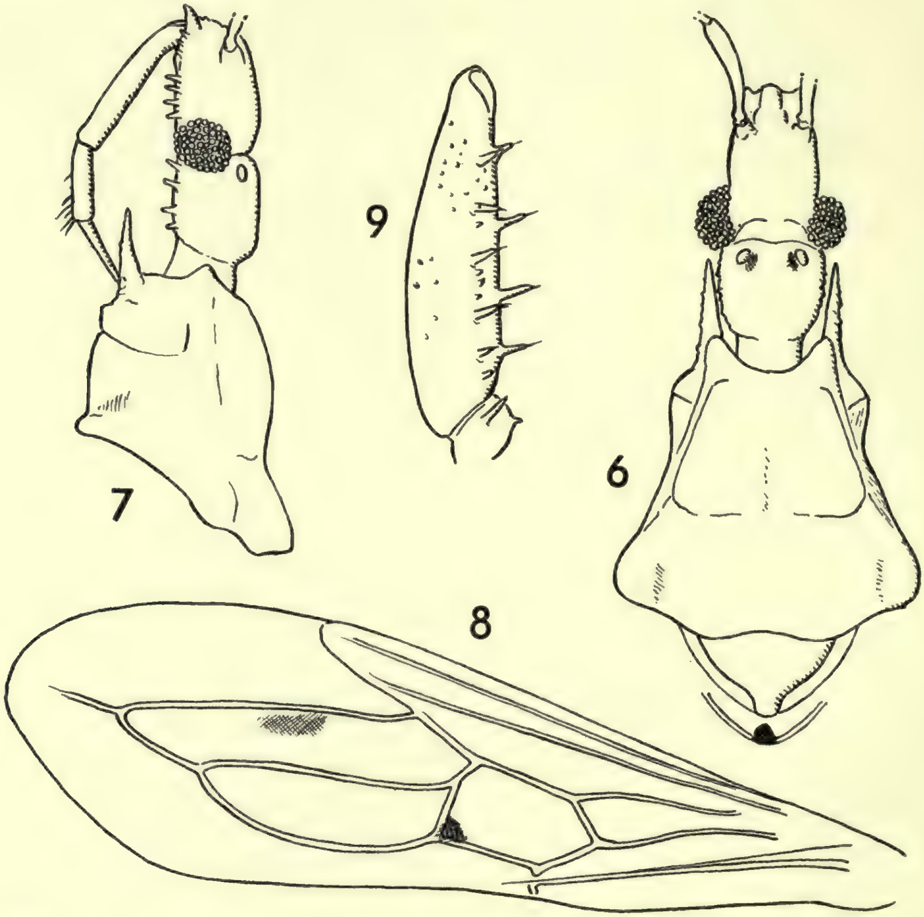
[1] **διοκτήρ** = a pursuer, **κορις** = a bug.

Allied to *Padasastra* Villiers (1948, *Réduv. Afric. noire,* p. 373) and *Collartiella* Schouteden (1931, *Ann. Mus. Congo belg. Zool.* (3), **1** : 109) from both of which it differs in the structure of the head and armature of the anterior femora. Also allied to *Staccia* Stål (1865, *Hem. Afr.* **3** : 150) from which it differs similarly and also in having no spines on the inner face of the basal rostral segment.



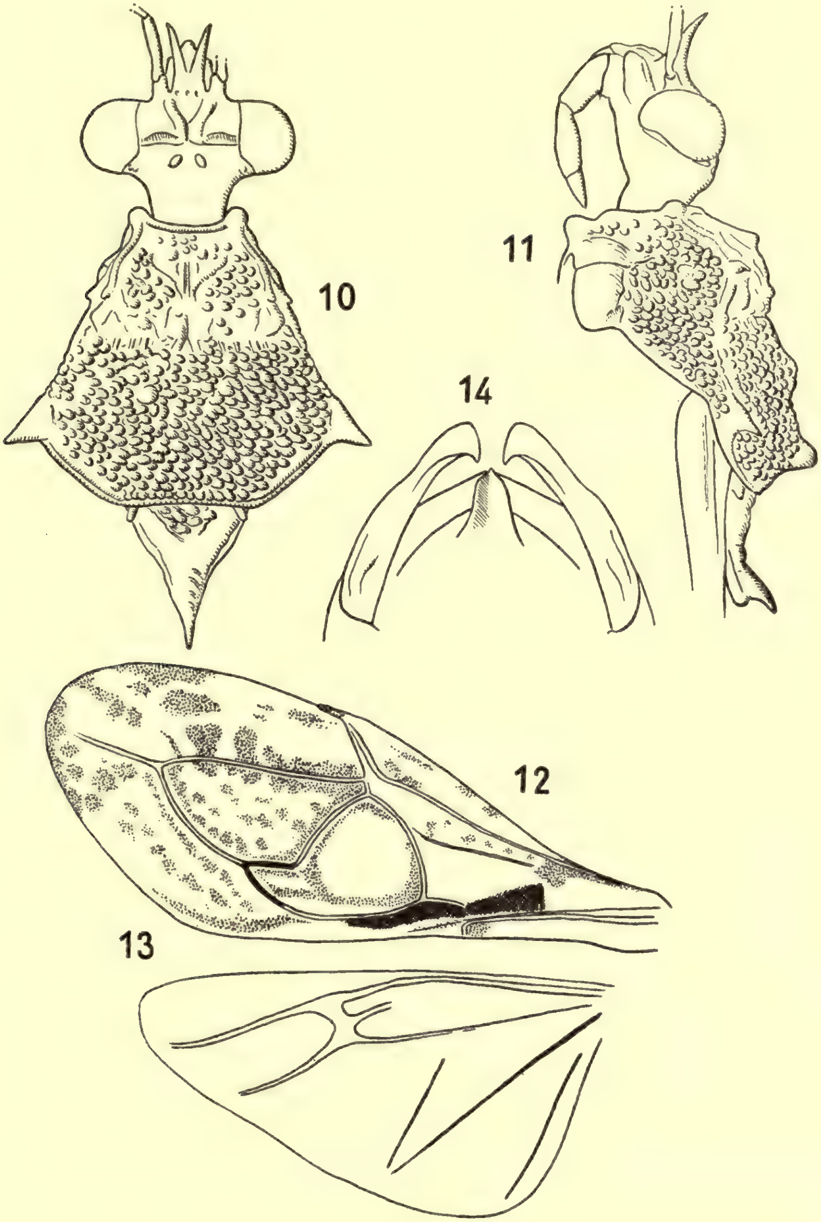
FIGS. 6–9. *Diokterocoris sudanicus* gen. nov., sp. n. (6) Head, pronotum, scutellum and postscutellum, dorsal view. (7) Head and pronotum, lateral view. (8) Hemelytron. (9) Anterior femur.

Subfamily CETHERINAE

Caprocethera crudelis sp.n.

(Text-figs. 10–14)

COLOUR. Testaceous. Head laterally, gula, piceous. Eyes black. Basal rostral segment with suffusion, apical segment piceous. Carinae on anterior pronotal lobe



Figs. 10–14. *Caprocethera crudelis* sp. n. (10) Head, pronotum and scutellum, dorsal view. (11) *Idem*, lateral view. (12) Hemelytron. (13) Metathoracic wing. (14) Apex of pygophore, dorsal view.

and some tubercles on posterior lobe pale ; collar, propleural episternum anteriorly piceous ; humeral spines piceous ; apex of scutellum very pale testaceous ; spine and apex of disc piceous ; meso- and metapleura with piceous suffusion ; stridulatory furrow, meso- and metasternum, piceous. Hemelytra with brown and piceous suffusion as in Text-fig. 12. Abdomen very pale testaceous ; mid-ventrally with a large, discal brown suffusion ; sublaterally with triangular spots and laterally with suffusion on segments 3–6, piceous ; pygophore brown ; connexivum dorsally with piceous suffusion at base of each segment. Anterior and median tibiae missing ; posterior tibiae whitish yellow with a median, basal and apical black annulation ; basal segment of posterior tarsi black ; segments 2 and 3 whitish yellow ; segment 3 suffused with piceous apically ; femora pale yellowish white with apex broadly and confluent suffusion, piceous.

STRUCTURE. Differs from *Caprocethera cave* Breddin (1903, *Sitz. Ges. Naturfr. Berlin*, p. 116), in having the spines between the antennophores more curved, the sulci on vertex and transverse sulcus wider and deeper, the anterior pronotal lobe with short, subacute, conical tubercles, discal tubercles on posterior lobe moderately narrow and rounded apically, the posterior lobe more coarsely rugose and tuberculate, the basal lateral scutellar spines less acute and the apical spine longer and more acute.

The pygophore in this new species has a moderately wide, subapical, acute, more or less parallel sided process, angulately concave on inner surface.

Total length, 10·50 mm.; hemelytra, 7·00 mm.; greatest pronotal width, 3·50 mm.

One ♂ (holotype), Ghana, Ifione, 2.v.1957, H. Roberts.

Sub-family REDUVIINAE

PHELETOCORIS gen. nov.[1]

SIZE. Small. Basal segment of antennae as long as anteocular ; segment 2 about five times longer than basal segment ; antennophores nearer to eyes than to apex of head ; basal segment of rostrum subequal in length to segment 2 ; head shorter than pronotum ; anteocular subequal in length to postocular ; vertex wider than an eye, with a bifurcate sulcus basally and a rounded elevation laterally basally ; ocelli widely separated, feebly elevated ; postocular gradually narrowed to base and medially sulcate between ocelli. Pronotum wider than long ; anterior lobe shorter than posterior lobe ; laterally carinate and with sulci and low elevations on disc ; posterior lobe medially depressed and laterally carinate ; depression with feeble transverse sulci ; prosternum with a median tubercle anteriorly ; posterior margin produced, acute, curved downwards ; scutellum as long as wide with apex produced and disc excavate. Hemelytra extending to apex of abdomen ; base of external cell of membrane wider than base of internal cell. Abdomen somewhat expanded, elliptical in outline ; segments 4–6 ventrolaterally feebly depressed. Anterior femora moderately incrassate ; anterior and median tibiae with a fossula spongiosa ; apical segment of tarsi as long as remaining segments together.

Type species, *Pheletocoris sordidus* sp. n. Text-figs. 15–18.

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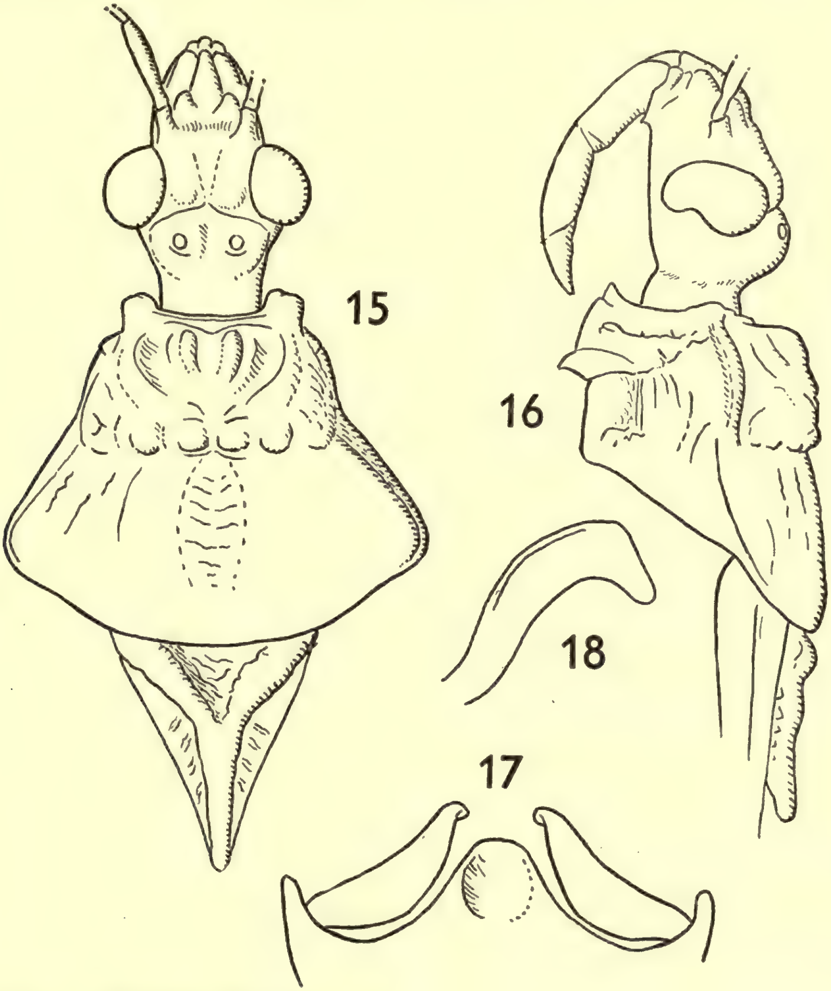
[1] *φηλήτης* = a thief, *κορις* = bug.

Pheletocoris sordidus sp. n.

Colour. Piceous. Elevations on vertex, lateral angles of collar, elevations on anterior pronotal lobe, parts of posterior lobe, particularly posteriorly, suffused with testaceous. Corium with testaceous suffusion medially ; area between claval suture and *Cu* with a fuscous spot ; membrane infumate. Connexival segments with a testaceous spot at external apical angle. Anterior and median tibiae with a little less than half basally, posterior tibiae suffused with reddish testaceous ; tarsi reddish testaceous ; segment 3 suffused with piceous.



Figs. 15–18. *Pheletocoris sordidus* gen. nov., sp. n. (15) Head, pronotum and scutellum, dorsal view. (16) *Idem*, lateral view. (17) Apex of pygophore, terminal view. (18) Harpago.

STRUCTURE. Vertex about one and a half times wider than an eye ; eyes a little shorter than height of head. Sulci on median depression on posterior pronotal lobe feeble. Fossula spongiosa a little less than one-third as long as tibia.

Total length, 10·00 mm.; hemelytra, 6·50 mm.; greatest pronotal width, 3·20 mm.

One ♂ (holotype), Solomon Islands, Guadalcanal, Mamara, 8.viii.1956, E. S. Brown.

Belongs to the *Velitra* complex. Differs from *Velitra* Stål (1865, ***Hemipt. Afric.* 3** : 122) in having the vertex relatively wider and with elevations basally laterally, the posterior pronotal lobe laterally carinate and the abdomen rounded mid-ventrally, not flattened.

DILOPHOCORIS gen. nov.[1]

SIZE. Small. Basal segment of antennae shorter than anteocular ; segment 2 longer than basal segment ; apical segments subequal in length. Head shorter than pronotum, transverse, tuberculate ; postocular wider than anteocular ; vertex wider than an eye ; tylus somewhat elevated ; interantennal elevations present ; ocelli widely separated ; antennophores nearer to eyes than to apex of head ; gula setose ; rostrum moderately thick ; basal segment subequal in length to segment 2 ; all segments setose. Anterior pronotal lobe shorter than posterior lobe with minute tubercles arranged in a pattern ; anterior lobe medially, longitudinally sulcate in basal half ; posterior lobe widely sulcate anteriorly, the sulcus with transverse carinulae ; propleura medially produced ; posterior pronotal lobe, pleura, scutellum, tuberculate ; apex of scutellum produced ; disc damaged ; prosternum on each side of stridulatory furrow with setigerous tubercles. Hemelytra extending to apex of abdomen ; veins of corium tuberculate. Femora moderately incrassate ; tuberculate on upper surface ; anterior and median femora spinose on lower surface ; fossula spongiosa present on anterior and median tibiae.

Type species, *Dilophocoris plagiatus* sp. n. Text-figs. 19–21.

Dilophocoris plagiatus sp. n.

COLOUR. Basal antennal segment testaceous ; remaining segments piceous. Head testaceous with vertex and postocular, except laterally, piceous. Thorax piceous ; acetabula suffused with testaceous. Corium testaceous with costa basally, a wide median transverse stripe and apex narrowly brownish infumate ; membrane infumate ; base of veins of internal cell, external vein of external cell testaceous. Abdomen testaceous ; connexival segments 2–6 with a quadrate piceous spot ; segments 8 and 9 dorsally suffused with piceous. Tarsi testaceous ; tibiae piceous, narrowly testaceous basally ; femora testaceous with a wide, subapical piceous annulation ; coxae and trochanters testaceous.

STRUCTURE. Segment 2 of antennae thicker and four times as long as basal segment ; apical segments filiform. Ocellar interspace twice as wide as space between an ocellus and an eye ; ocelli moderately large ; vertex about three times wider than an eye. Scutellar spine horizontal, rounded apically. Produced portion of propleura short, conical. Setae on gula, rostrum, sides of stridulatory furrow robust. Tubercles very short and with short, recumbent setae. Fossula spongiosa very short.

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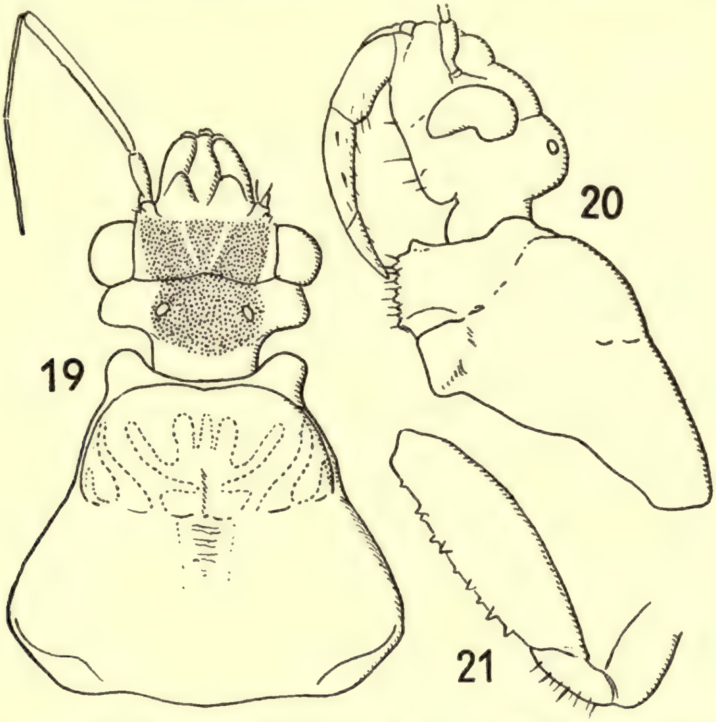
[1] **δiλοφος = with 2 humps, κοριϛ = a bug.**

Total length, 8·00 mm.; hemelytra, 5·00 mm.; greatest pronotal width, 2·00 mm.



FIGS. 19–21. *Dilophocoris plagiatus* gen. nov., sp. n. 19. Head and pronotum, dorsal view. (20) *Idem*, lateral view. (21) Anterior femur, coxa and trochanter.

One ♀ (holotype), Australia, Queensland, Mackay, A. J. Turner (B.M. 1905–125).

The affinity of this new genus is doubtful. It is possibly allied to *Sphedanocoris* Stål, 1866, *Öfv. Vet.-Ak. Förh.*, p. 240.

POECILOPTEROCORIS gen. nov.[1]

SIZE. Very small. Segments 1 and 2 of antennae moderately thick; segment 2 longer than basal segment; segments 3 and 4 together subequal in length to 1 and 2 together; segments 2–4 with abundant, short, forwardly directed setae; basal segment extending beyond apex of head; antennophores nearer to eyes than to apex of head; anteocular shorter than postocular, the latter transverse and abruptly constricted basally; tylus with setigerous tubercles apically; vertex wider than an eye; ocelli moderately large, widely separated, not prominent; head smooth

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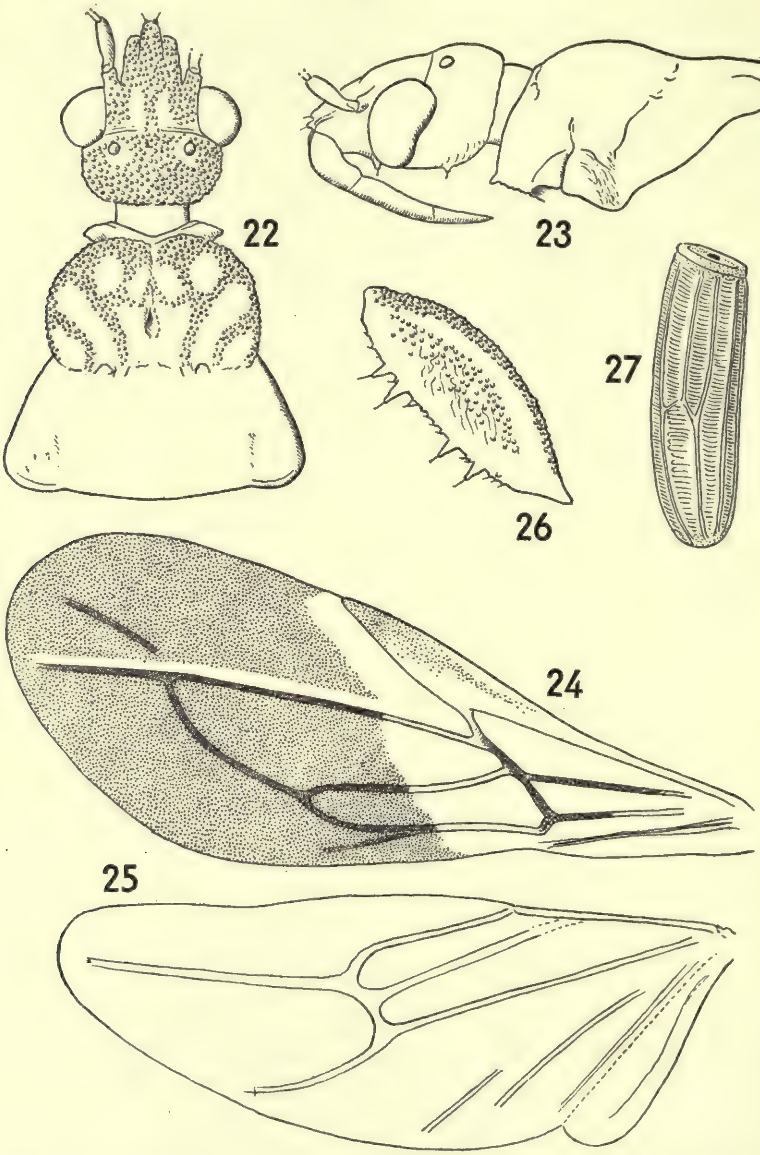
[1] *ποικιλόπτερος* = with wing of changeful colour, *κορις* = bug.

with areas of low setigerous tubercles ; gula concave, laterally with tubercles ; basal segment of rostrum subequal in length to segment 2. Pronotum as wide as long ; lateral angles of collar produced ; anterior lobe longer than posterior lobe, smooth with areas of low setigerous tubercles and a submedian foveole ; posterior lobe rugose punctate and with short carinae anteriorly ; transverse sulcus foveolate ;



FIGS. 22–27. *Poecilopterocoris amabilis* gen. nov., sp. n. (22) Head and pronotum, dorsal view. (23) *Idem*, lateral view. (24) Anterior femur. (25) Hemelytron. (26) Metathoracic wing. (27) Ovum.

humeral angles rounded ; prosternum laterally tuberculate ; lateral margins of stridulatory furrow with low, setigerous tubercles ; scutellum as wide as long with apex produced ; disc excavate, rugose. Hemelytra extending almost to apex of abdomen ; interveinal areas of corium and base of membranal cells hyaline ; base of internal cell of membrane wider than base of external cell ; veins of corium thick, prominent. All femora incrassate and with low, setigerous tubercles on upper and lateral surfaces and with linear areas lacking tubercles ; anterior femora spined on lower surface ; anterior tibiae with setigerous tubercles on lower surface ; tarsi with 3 segments ; fossula spongiosa on anterior and median tibiae.

Type species, *Poecilopterocoris amabilis* sp. n. Text-figs. 22–27.

Poecilopterocoris amabilis sp. n.

Colour. Piceous. Apical segment of rostrum and humeral angles testaceous ; tibiae, tarsi, coxae and trochanters testaceous. Connexivum pale testaceous with a quadrate spot at apex of segments piceous ; apex of segment 7 piceous. Median and posterior femora with an obscure, pale testaceous annulation sub-basally.

Structure. Vertex a little more than twice as wide as an eye. Ocellar interspace a little less wide than vertex. Spines on anterior femora truncate apically and setigerous. Fossula spongiosa short and extended beyond apex of tibiae.

Total length, ♂ 4·50 mm., ♀ 5·00 mm.; hemelytra, ♂ 2·80 mm., ♀ 3·00 mm.; greatest pronotal width, ♂ 1·00 mm., ♀ 1·10 mm.

One ♂ (holotype), 1 ♀ (paratype), New Guinea, Lae, iii.1957, R. W. Paine.

The affinity of this new genus is doubtful. Possibly it should be placed near *Sphedanocoris* Stål (loc. cit.).

Ovum (Text-fig. 27). Cylindrical ; chorion feebly oblique at opercular end and with longitudinal carinae on most of surface ; between carinae, some of which anastomose, there are transverse striae ; operculum elliptical with a low, subovate elevation medially. Dark yellow with carinae brownish ; operculum apparently whitish. Length, 1·10 mm. (dissected).

This is a large ovum in relation to the species and it is probable that only about 6–10 develop at one time.

The Genus ***TIARODES***[1] Burmeister

The genus *Tiarodes* was established by Burmeister in 1835 (*Handb.* **2** : 237) for *Cimbus versicolor* Laporte (1832, *Essai Classif. Syst. Hem.*, p. 80 suppl.).

Some of the most brightly coloured of the Reduviidae are contained in the genus. Unfortunately, much of the brilliance is lost after death when the red or reddish yellow areas become darker and the white or pale yellow areas, for example, the spots on the corium or the connexival segments turn to a dull yellow. Metallic green or blue colours occur. These, however, do not fade as a rule, or become discoloured.

Little is known of the habitats and nothing of the prey of *Tiarodes* species ; some have been found among decaying vegetable debris and also under the loose bark of dead trees. Specimens are frequently met with which have mites attached to the ventral surface and legs, a condition often to be observed in species belonging to other genera of Reduviidae occupying similar habitats.

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[1] τιάρα = a tiara, in allusion to the shape of the head.

The secluded type of life of *Tiarodes* species, no doubt, accounts for their being frequently overlooked by collectors, consequently in collections rarely is a species represented by more than single or a very few specimens.

Information concerning the developmental stages is equally scanty. The ova are deposited loosely and without adhesive in the soil or under the bark of trees.

The ovum of *T. nigrirostris* Stål, obtained by dissection is more or less regularly oval with a smooth chorion and with the opercular end less broadly rounded than the opposite end.

Up to the present time 33 species have been described. In the present paper 45 new species are described and photographically illustrated. Photographs are also provided of the species already described.

Tiarodes rusticus Distant (1919, *Entomologist*, **52** : 245) should not have been placed in the genus. It has since been transferred to a new genus, *Neotiarodes* (Miller, 1957, *Bull. Brit. Mus*, **5**, 2 : 40–41).

Mention should be made of a representative of the genus from Ternate for the purpose of amplifying the distributional picture. It is unfortunately, in too damaged a condition for description. This specimen forms part of a collection received by me from the Rijksmuseum van Natuurlijke Historie, Leiden.

Dr. S. von Kéler, Zoologisches Museum, Humboldt Universität, Berlin kindly sent me a consignment of *Tiarodes* species among which is a species labelled by Breddin. The description, however, has not been published. In view of the fact that the data label bears no collector's name and the locality of origin is indecipherable, I have decided that it would be unwise to include this species in the present study, although it is undoubtedly a new species. It resembles in coloration *T. bradleyi* sp. n. from the Solomon Islands and also *T. obyanus* Distant from Obi Island.

I have not been able to examine the type of *T. kükenthali* Breddin. Professor Dr. Sachtleben, Deutsches Entomologisches Institut, Berlin has informed me that it cannot be traced in the collections at the Institut.

Tiarodes species may be divided into four distinct groups. The first, which I designate the *nigrirostris* group contains mostly the largest species varying from 20·00 mm. to 30·00 mm. in length and characterized by having a yellow discal spot and sometimes yellow suffusion basally on the corium of the hemelytra.

The head in this group is cylindrical, occasionally with obscure striations, mostly laterally, and sometimes sparsely setose. The anteocular is appreciably narrowed towards the apex.

The prosternum is smooth and has no projections laterally. The anterior and median femora are strongly incrassate and the anterior and median tibiae are incrassate for about half their length, with the fossula spongiosa about half as long.

Present records show that this group is distributed in Indo-China, Malaysia and Indonesia.

The second group, the *waterstradti* group, contains species which are about 20·00 mm. in length and which are closer morphologically to those in the *nigrirostris* group, but which have the anterior and median tibiae incrassate for a little more than a quarter of their length and the anterior and median femora moderately incrassate. The fossula spongiosa is about one-quarter as long as the tibiae and the meso- and metasternum have a median longitudinal carina.

The hemelytra in this group may be pale yellow or fuscous with a pale yellow discal spot, isolated or extended to the base of the corium.

To the third group I give the name *versicolor*. It contains species measuring approximately 10·00–20·00 mm. in length. The head is cylindrical with the gula somewhat flattened and with abundant, recumbent, spatulate setae. Viewed from above the anteocular has parallel sides. It is also striate to a greater or less degree particularly laterally. The prosternum is produced laterally.

The hemelytra are fuscous or black and have usually a wide or narrow red or reddish yellow area or suffusion at the base of the corium, or a pale discal spot as well as a basal suffusion.

The fossula spongiosa are mostly about one-quarter as long as the tibiae, the apex of which is not very strongly incrassate.

This is widely distributed as will be seen from the list of species given in this paper.

Two species about 15·00 mm. in length from the Philippine Islands, namely *T. cruentus* Stål and *T. luzonicus* sp. n. constitute the fourth group, the *cruentus* group. These species have relatively more slender tibiae, a very short fossula spongiosa, relatively less incrassate anterior and median femora, narrower and very feebly striate head on which the transverse sulcus is very shallow. The prosternum is feebly produced laterally and the mesosternum has a wide sulcus medially. The hemelytra are distinctly bicolorous.

KEY TO *Tiarodes* GROUPS

1.	Meso- and metasternum with a median longitudinal carina	2
–	Meso- and metasternum without a median longitudinal carina	3
2.	Anterior tibiae incrassate for half their apical length	*nigrirostris* group
–	Anterior tibiae incrassate for one-fourth of their apical length	*waterstradti* group
3.	Mesosternum with a median sulcus	*cruentus* group
–	Mesosternum without a median sulcus	*versicolor* group

KEY TO SPECIES IN *nigrirostris* GROUP

1.	Thorax black with faint metallic lustre	2
–	Thorax not black	3
2.	Abdomen ventrally red with large black spot on seventh segment	*nobilis* sp. n.
–	Abdomen ventrally with segments 2–5 red, 6 and 7 black	*pustulatus* Stål
3.	Thorax including scutellum light red	*sakai* Miller
–	Thorax yellow and black; scutellum black	4
4.	Pronotum yellow with feeble piceous suffusion on posterior lobe posteriorly	5
–	Pronotum differently coloured	6
5.	Abdomen ventrally yellow	*lotus* sp. n.
–	Abdomen ventrally yellow with transverse black stripes	*opulentus* sp. n.
6.	Posterior pronotal lobe dark yellow anteriorly, black posteriorly	7
–	Posterior or pronotal lobe mostly piceous	9

7. Connexivum yellow with black spots 8
– Connexival segments 2–5 black, 6 and 7 yellow . . . . . . *ostentans* sp. n.
8. Meso- and metapleura black . . . . *nigrirostris* Stål
– Meso- and metapleura reddish yellow . . . . *jucundus* sp. n.
9. Connexival segments yellow with black spots 10
– Connexival segments 2–4 black, 5–7 yellow . . . . . . *sulaensis* sp. n.
10. Discal spot on corium small, circular . . . . *scriptus* sp. n.
— Discal spot on corium moderately large 11
11. Discal spot on corium extended to costal margin 12
— Discal spot on corium not extended to costal margin 13
12. Connexival segments 2 and 3 piceous . . . . . . *juncturus* Walker
— Connexival segments 2 and 3 piceous with yellow spot . . . *hieroglyphicus* Miller
13. Connexivum of seventh segment dorsally piceous ; posterior pronotal lobe with an obscure oblique dark yellow spot on each side of median depression . *erinnys* Miller
— Connexivum of seventh segment dorsally piceous with a white spot apically ; posterior pronotal lobe with a distinct, moderately large oblique dark yellow spot on each side of median depression . . . . *xanthusi* Reuter

Key to Species in *waterstradti* Group

1. Tibiae black ; pronotum castaneous . . . . *amoenus* Miller
– Tibiae differently coloured ; pronotum yellow with piceous spot on anterior lobe posteriorly 2
2. Median and posterior tibiae black 3
– Median and posterior tibiae pale yellow with piceous suffusion basally and apically 5
3. Corium yellow with apex fuscous and with faint brownish suffusion between claval suture and *Cu* . . . . *simplex* sp. n.
– Corium fuscous 4
4. Corium with large pale yellow discal spot extending to costal margin *waterstradti* Breddin
– Corium with large pale yellow discal spot extending to costal margin and also to base *acutangulus* sp. n.
5. Segments 1 and [illegible] antennae piceous ; antennophores testaceous *sumatrensis* sp. n.
– Segments 1 and 2 of antennae testaceous, basally and apically piceous ; antennophores black 6
6. Anterior pronotal lobe with very feeble diagonal depression subdorsally ; produced portion of posterolateral angles of posterior pronotal lobe thick, triangular, subacute . . . . *malayanus* Distant
– Anterior pronotal lobe with a distinct, shallow, circular depression subdorsally ; produced portion of posterolateral angles of posterior pronotal lobe narrowly conical, acute . . . . *nemoralis* sp. n.

Key to Species in *versicolor* Group

1. Size under 14·00 mm. 2
– Size 14·00 mm. and greater 8
2. Pronotum unicolorous 3
– Pronotum not unicolorous 7
3. Abdomen entirely black or piceous 4
– Abdomen red with apical segments black 5
4. Corium black, narrowly reddish basally . . . . *serenus* Miller
– Corium reddish fuscous, moderately broadly suffused with red basally . *dohertyi* Miller
5. Corium entirely fuscous . . . . *bradleyi* sp. n.

– Corium fuscous with base reddish or yellowish 6
6. Base of corium broadly reddish . . . . *obyanus* Distant
– Base of corium narrowly yellow . . . . *biroi* sp. n.
7. Anterior pronotal lobe violaceous, collar red, corium black . . . *browni* sp. n.
– Anterior pronotal lobe brown ; corium fuscous with apex pale yellow *picturatus* Distant
8. Corium with discal yellow spot 9
– Corium without a discal yellow spot 12
9. Gula entirely red 10
– Gula piceous, narrowly red basally 11
10. Abdomen ventrally piceous with violaceous lustre ; basal segments suffused with red . . . . *mirandus* Miller
— Abdomen ventrally reddish . . . . *bukit* Miller
11. Abdomen ventrally yellowish . . . . *elongatus* Miller
— Ventral abdominal segments 2 and 3 red . . . . . . *rufithorax* Reuter
12. Pronotum dark blue with metallic lustre 13
— Pronotum light red 18
13. Corium black 14
— Corium almost entirely light red 16
14. Legs yellow or red 15
— Legs yellow ; femora apically, tibiae basally black . . . . . *insulanus* sp. n.
15. Legs red ; abdomen light red . . . . *miles* sp. n.
— Legs yellow ; abdomen yellow . . . . *schultzei* sp. n.
16. Basal third of corium fuscous ; remainder light red . . . . . *dubius* Reuter
— Basal third of corium not fuscous 17
17. Hemelytral membrane black . . . . *varicolor* Stål
— Hemelytral membrane fuscous with basal half of internal cell and anal area yellow *elegans* Stål
18. Legs red ; clavus, greater part of area between claval suture and *Cu* yellow *varipennis* sp. n.
— Legs not entirely red ; clavus and area between claval suture and *Cu* black . . 19
19. Femora piceous with bluish lustre 20
— Femora red, apically piceous 22
20. Scutellum coral red . . . . *kukenthali* Breddin
— Scutellum black or piceous 21
21. Segments 2–5 of abdomen ventrally red ; remaining segments piceous with metallic blue lustre . . . . *attrahens* sp. n.
— Segments 2–5 of abdomen ventrally yellow ; remaining segments and mid-ventrally piceous . . . . *ovatulus* Miller
22. Abdomen piceous ; scutellum reddish yellow 23
— Abdomen and scutellum differently coloured 24
23. Meso- and metapleura light red . . . . *brunneiventris* sp. n.
— Meso- and metapleura light red with metallic bluish spot . . . . *meldolae* Distant
24. Corium black or fuscous broadly laterally light red 25
— Corium black or fuscous 27
25. Segment 6 of connexivum pale yellow . . . . *convivus* Miller
— Segment 6 of connexivum not pale yellow 26
26. Segment 6 of connexivum red . . . . *timorensis* sp. n.
— Segment 6 of connexivum piceous . . . . *frühstorferi* Breddin
27. Abdomen piceous ; segments 6 and 7 with connexivum yellow 28
— Abdomen differently coloured 29
28. Posterior femora piceous . . . . *mouhoti* sp. n.
— Posterior femora red, apically piceous . . . . *dux* sp. n.
29. Anterior tibiae piceous ; red in apical half 30
— Anterior tibiae piceous 32

30. Connexival segments 2–5 without a yellow spot; segment 6 ventrolaterally with a large yellow spot . . . *celebensis* sp. n.

— Connexival segments 2–5 with a yellow spot; abdominal segments 6, 7 and 9 yellow . . . 31

31. Other segments of abdomen ventrally piceous . . . *excellens* sp. n.

— Other segments of abdomen ventrally red, narrowly piceous with bluish lustre laterally . . . *salvazai* sp. n.

32. Connexival segments 2–5 without a yellow spot . . . 33

— Connexival segments 2–5 with a yellow spot . . . 41

33. Connexival segments 6 and 7 yellow . . . 34

— Connexival segment 6 yellow, 7 piceous . . . 35

34. Ventral abdominal segment 6 yellow, 7 piceous suffused with yellow . . . *helluo* sp. n.

— Ventral abdominal segments 6 and 7 piceous, yellow laterally . . . *obscuripennis* sp. n.

35. Anterior and median femora red, obscurely piceous apically . . . *rabiosus* Miller

— Anterior and median femora red, moderately broadly and distinctly piceous apically 36

36. Abdomen ventrally mostly piceous . . . 37

— Abdomen ventrally mostly red . . . 38

37. Corium black with obscure reddish suffusion basally . . . *similis* sp. n.

— Corium fuscous with distinct, wide, reddish suffusion basally . . . *ambulator* sp. n.

38. Segment 7 of abdomen yellow suffused with piceous apically; segment 6 yellow suffused with red mid-ventrally . . . *assamensis* sp. n.

— Segment 7 of abdomen piceous; segment 6 piceous suffused with yellow laterally . 39

39. Segments 2–5 of abdomen ventrally piceous . . . *cameronicus* sp. n.

— Segments 2–5 of abdomen ventrally not piceous . . . 40

40. Segments 2–5 of abdomen red mid-ventrally . . . *versicolor* (Laporte)

— Segments 2–4 red mid-ventrally; segment 5 piceous with faint reddish suffusion *servus* sp. n.

41. Ventral abdominal segments 6 and 7 yellow . . . 42

— Ventral abdominal segments 6 and 7 piceous, yellow laterally . . . 47

42. Ventral abdominal segments 6 and 7 with brown suffusion mid-ventrally *hageni* sp. n.

— Ventral abdominal segments 6 and 7 not suffused with brown . . . 43

43. Corium fuscous with red suffusion basally . . . 44

— Corium black with red or yellow suffusion basally . . . *hilaris* sp. n.

44. Corium with very faint reddish suffusion basally . . . *gracilis* sp. n.

— Corium with moderately broad reddish suffusion basally . . . 45

45. Anterior and median femora red, narrowly piceous apically; meso- and metapleura piceous with metallic blue lustre . . . *vilis* sp. n.

— Anterior and median femora red, broadly piceous apically; meso- and metapleura red . . . 46

46. Apical margin of seventh ventral abdominal segment yellow . . . *vorax* Miller

— Apical margin of seventh ventral abdominal segment piceous . . . *propinquus* sp. n.

47. Segment 6 of abdomen ventrolaterally with a large triangular yellow spot *vexillarius* sp. n.

— Segment 6 of abdomen ventrolaterally with a yellow spot or suffusion . . . 48

48. Segment 7 of abdomen ventrolaterally with a yellow spot or suffusion . . . 49

— Segment 7 of abdomen ventrolaterally without a yellow spot or suffusion *obscuripes* sp. n.

49. Corium fuscous . . . 50

— Corium fuscous with narrow reddish suffusion basally . . . 51

50. Connexivum of seventh abdominal segment ventrally basally yellow . *flavicans* sp. n.

— Connexivum of seventh abdominal segment ventrally piceous . *taipingensis* Miller

51. Reddish suffusion at base of corium well defined . . . 52

— Reddish suffusion at base of corium ill-defined . . . 54

52. Spots on connexival segments 3–5 wide and well defined . . . 53

— Spots on connexival segments 3–5 narrow and with somewhat suffused margins *dyak* sp. n.

53. Ventral abdominal segments 2 and 3 moderately broadly red ; part of segments 4 and 5 red . . . . *mjöbergi* sp. n.

— Ventral abdominal segments 2 and 3 narrowly red ; part of segments 4 and 5 not red *nitidus* Miller

54. Abdominal segment 7 ventrolaterally with a large, pale yellow spot . *nebulosus* sp. n.

— Abdominal segment 7 ventrolaterally with a very small pale yellow spot . . 55

55. Segment 2 of abdomen mid-ventrally red . . . . . . *selangorensis* Miller

— Segments 2–6 of abdomen mid-ventrally suffused with red . . . *veneficus* Miller

KEY TO SPECIES IN *cruentus* GROUP

1. Corium black with apical half coral red and base with faint red suffusion ; membrane black . . . . *luzonicus* sp. n.

– Corium light red with wide, transverse fuscous stripe sub-basally ; membrane fuscous . . . . *cruentus* Stål

List of Species in nigrirostris *Group*

	Distribution	Holotype
Tiarodes erinnys Miller	Sarawak	British Museum (N.H.), London.
T. hieroglyphicus Miller	Malaya	,, ,, ,,
T. jucundus sp. n.	Sumatra	Rijksmuseum van Natuurlijke Historie, Leiden.
T. juncturus Walker	*patria ignota*	British Museum (N.H.), London.
T. lotus sp. n.	Sumatra	Rijksmuseum van Natuurlijke Historie, Leiden.
T. nigrirostris Stål	Java	Natuurhistoriska Riksmuseet, Stockholm.
T. nobilis sp. n.	Ceram	British Museum (N.H.), London.
T. opulentus sp. n.	Siam	,, ,, ,, ,,
T. ostentans sp. n.	Indo-China	Rijksmuseum van Natuurlijke Historie, Leiden.
T. pustulatus Stål	Batchian	British Museum (N.H.)., London
T. sakai Miller	Malaya	,, ,, ,, ,,
T. scriptus sp. n.	Borneo	,, ,, ,, ,,
T. sulaensis sp. n.	Sula I.	Naturhistoriska Riksmuseet, Stockholm.
T. xantusi Reuter	Borneo	Magyar Nemzeti Muzeum, Budapest, Hungary.

List of Species in waterstradti *Group*

Tiarodes acutangulus sp. n.	Sarawak	British Museum (N.H.), London.
T. amoenus Miller	,,	,, ,, ,, ,,
T. malayanus Distant	Malaya	,, ,, ,, ,,
T. nemoralis sp. n.	,,	,, ,, ,, ,,
T. simplex sp. n.	Borneo	Rijksmuseum van Natuurlijke Historie, Leiden.
T. sumatrensis sp. n.	Sumatra	Zoologisches Museum, Humboldt Universität, Berlin.
T. waterstradti Breddin	Borneo	Deutsches Entomologisches Institut, Berlin.

List of Species in versicolor *Group*

Tiarodes ambulator sp. n.	Sumatra	Zoologisches Museum, Humboldt Universität, Berlin.
T. assamensis sp. n.	Assam	Naturhistoriska Riksmuseet, Stockholm.
T. attrahens sp. n.	Sumba I.	Rijksmuseum van Natuurlijke Historie, Leiden.

T. biroi sp. n.	New Guinea	Magyar Nemzeti Muzeum, Budapest, Hungary.
T. bradleyi sp. n.	Solomon Is.	British Museum (N.H.), London.
T. browni sp. n.	,,	,, ,, ,, ,,
T. brunneiventris sp. n.	Assam	,, ,, ,, ,,
T. bukit Miller	Malaya	,, ,, ,, ,,
T. cameronicus sp. n.	,,	,, ,, ,, ,,
T. celebensis sp. n.	Celebes	Rijksmuseum van Natuurlijke Historie, Leiden.
T. convivus Miller	Enggano Is.	,, ,, ,, ,,
T. dohertyi Miller	Halmahera	British Museum (N.H.), London.
T. dubius Reuter	Philippine Is.	Zoologisches Museum, Humboldt Universität, Berlin.
T. dux sp. n.	Burma	British Museum (N.H.), London.
T. dyak sp. n.	Borneo	Magyar Nemzeti Muzeum, Budapest, Hungary.
T. elegans Stål	Ceylon	?
T. elongatus Miller	Sarawak	British Museum (N.H.), London.
T. excellens sp. n.	Siam	,, ,, ,, ,,
T. flavicans sp. n.	Malaya	,, ,, ,, ,,
T. frühstorferi Breddin	Lombok	Deutsches Entomologisches Institut, Berlin.
T. gracilis sp. n.	Borneo	Rijksmuseum van Natuurlijke Historie, Leiden.
T. hageni sp. n.	Sumatra	,, ,, ,, ,, ,, ,,
T. helluo sp. n.	Cochin China	,, ,, ,, ,, ,, ,,
T. hilaris sp. n.	Borneo	Magyar Nemzeti Muzeum, Budapest, Hungary.
T. insulanus sp. n.	Philippine Is.	British Museum (N.H.), London.
T. kukenthali Breddin	Batchian	?Deutsches Entomologisches Institut, Berlin.
T. meldolae Distant	Andaman Is.	British Museum (N.H.), London.
T. miles sp. n.	Philippine Is.	,, ,, ,, ,,
T. mirandus Miller	Malaya	,, ,, ,, ,,
T. mjöbergi sp. n.	Sarawak	,, ,, ,, ,,
T. mouhoti sp. n.	Cambodia	,, ,, ,, ,,
T. nebulosus sp. n.	Borneo	Rijksmuseum van Natuurlijke Historie, Leiden.
T. nitidus Miller	,,	Deutsches Entomologisches Institut, Berlin.
T. obscuripennis sp. n.	Malaya	British Museum (N.H.), London.
T. obscuripes sp. n.	Sarawak	,, ,, ,, ,,
T. obyanus Distant	Obi Is.	,, ,, ,, ,,
T. ovatulus Miller	Solor Is.	,, ,, ,, ,,
T. picturatus Distant	Batchian	,, ,, ,, ,,
T. propinquus sp. n.	Borneo	Rijksmuseum van Natuurlijke Historie, Leiden.
T. rabiosus Miller	Java	Deutsches Entomologisches Institut, Berlin.
T. rufithorax Reuter	Malaya	Magyar Nemzeti Museum, Budapest, Hungary.
T. salvazai sp. n.	Indo-China	Rijksmuseum van Natuurlijke Historie, Leiden.
T. schultzei sp. n.	Philippine Is.	British Museum (N.H.), London.
T. selangorensis Miller	Malaya	,, ,, ,, ,,
T. serenus Miller	New Guinea	Rijksmuseum van Natuurlijke Historie, Leiden.
T. servus sp. n.	Sumatra	British Museum (N.H.), London.
T. similis sp. n.	Malaya	,, ,, ,, ,,
T. taipingensis Miller	,,	,, ,, ,, ,,
T. timorensis sp. n.	Timor	,, ,, ,, ,,
T. varicolor Stål	Philippine Is.	Naturhistoriska Riksmuseet, Stockholm.
T. varipennis sp. n.	Sumatra	Riksmuseum van Natuurlijke Historie, Leiden.
T. veneficus Miller	Malaya	British Museum (N.H.), London.
T. versicolor (Laporte)	Java	?
T. vexillarius sp. n.	Borneo	Magyar Nemzeti Muzeum, Budapest, Hungary.
T. vilis sp. n.	Indo-China	Rijksmuseum van Natuurlijke Historie, Leiden.
T. vorax Miller	Borneo	British Museum (N.H.), London.

List of Species in cruentus *Group*

Tiarodes cruentus Stål	Philippine Is.	Naturhistoriska Riksmuseet, Stockholm.
T. luzonicus sp. n.	,,	British Museum (N.H.), London.

Tiarodes jucundus sp. n.

(Pl. 1, fig. 6)

Colour. Antennae missing. Head shining black ; gula, anteocular narrowly, postocular widely, base laterally, yellow ; rostrum missing. Thorax reddish yellow ; lateral angles of collar paler ; anterior pronotal lobe with 4 obscure piceous spots basally ; posterior two-thirds of posterior lobe and all of median depression, piceous ; scutellum piceous ; foveole with faint reddish suffusion. Hemelytra black ; corium with a large, transverse, ovate spot extending to costal margin, yellow. Connexivum black ; segment 2 with faint yellow suffusion laterally ; segments 3–6 with a large, suboblique transverse spot apically, segment 7 with apex yellow ; segments 2–5 of abdomen ventrally reddish yellow, with a piceous spot laterally ; segment 5 laterally with suffusion, segments 6–8 yellow ; segment 5 with 2 transverse spots mid-ventrally ; segment 6 with an arcuate spot, segment 7 with an ovate spot and a median stripe leading to apex, piceous. Tibiae and tarsi black ; coxae, trochanters, femora light red ; anterior and median femora narrowly apically, posterior femora very broadly apically black.

Structure. Anteocular with feeble, regular, transverse striae laterally. Median depression on anterior and posterior pronotal lobes wide and deep, that on posterior lobe with somewhat obscure, transverse striae and a deep, transverse foveole anteriorly ; transverse sulcus with 1 deep, subcircular foveole and a smaller ovate foveole ; posterolateral angles moderately strongly produced, conical, acute, directed inwards somewhat ; apex of scutellum narrowly rounded ; discal foveole moderately deep, strongly transversely depressed anteriorly. Hemelytra extending to apex of abdomen. Fossula spongiosa half as long as tibiae.

Total length, 31·00 mm.; hemelytra, 18·00 mm.; greatest pronotal width, 9·10 mm.

One ♀ (holotype), Sumatra, Serdang, Tobermeer, Dr. B. Hagen.

Tiarodes lotus sp. n.

(Pl. 1, fig. 10)

Colour. Segments 1 and 2 of antennae piceous ; remaining segments missing. Head shining black with faint metallic green lustre ; anteocular and postocular laterally, gula and base whitish yellow ; neck dorsally almost entirely piceous ; basal segment of rostrum piceous ; remaining segments testaceous. Thorax yellow ; anterior pronotal lobe with faint linear brown suffusion ; posterior lobe with brown suffusion medially and laterally posteriorly. Corium and membrane black, the former with a subreniform pale yellow spot extending almost to costal margin. Abdomen reddish yellow ; connexival segments with irregular black spots. Tarsi brown ; coxae, trochanters and femora yellow ; anterior and median femora with broad black suffusion in apical half ; tibiae black.

STRUCTURE. Head smooth ; anteocular laterally with obscure, widely-spaced, transverse striae. Median depression on anterior and posterior pronotal lobes very deep, wide, short ; transverse sulcus with a deep, circular foveole on each side of depression ; posterolateral angles of posterior lobe moderately strongly produced, slender, acute, directed backwards ; apex of scutellum narrowly rounded ; foveole on disc deep with obscure transverse sulci. Hemelytra extending to apex of abdomen. Fossula spongiosa on anterior tibiae about one-half as long, on median tibiae one-third as long as tibiae.

Total length, 21·50 mm.; hemelytra, 14·00 mm.; greatest pronotal width, 6·00 mm.

One ♂ (holotype), Sumatra, Solok, 1913, P. O. Stolz.

Tiarodes nobilis sp. n.

(Pl. 1, fig. 8)

COLOUR. Segments 1 and 2 of antennae dark brown ; remaining segments testaceous. Head, segments 1 and 2 of rostrum black ; segment 3 of rostrum brown ; base of head suffused with brown. Thorax black. Hemelytra black with a yellow discal spot. Abdomen light red ; segment 2 ventrally except laterally, black ; segments 3–6 basally and apically with transverse piceous suffusion ; segment 7 with a large, lunate black spot with margin suffused with brown ; genital segments black. Legs light red ; tibiae basally and apically, femora apically black ; tarsi brown ; suffusion on anterior tibiae relatively wider ; coxae and trochanters black.

STRUCTURE. Head smooth, shining with feeble transverse striae laterally and on antennophores. Median sulcus on posterior pronotal lobe transversely carinulate ; posterolateral angles of posterior lobe produced, subacute, directed backwards. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa a little less than half as long as tibiae.

Total length, 29·00 mm.; hemelytra, 17·00 mm.; greatest pronotal width, 8·00 mm.

One ♀ (holotype), Ceram, Wallace (A. R.).

Tiarodes opulentus sp. n.

(Pl. 1, fig. 11)

COLOUR. Antennae missing. Head dorsally black ; laterally, ventrolaterally and base pale yellow ; rostrum missing. Thorax, except scutellum, light red ; scutellum piceous ; meso- and metapleura with piceous suffusion. Median depression on posterior pronotal lobe, posterior margin of lobe suffused with piceous. Hemelytra fuscous with a large discal yellow spot, the external margin of which extends to costa. Abdomen dorsally yellow with faint red suffusion ; connexival segment 2, most of 3 and 4 black ; segment 5 with a large spot, bifurcate on inner margin at base of segment, segment 6 with a smaller spot, segment 7 with a still smaller spot, black ; abdomen ventrally yellow with faint red suffusion ; connexival segments 2, 3 and 4 (except apex), black ; segments 5 and 6 with a large black spot basally ;

segments 2 and 3 ventrally black, both with yellow suffusion laterally ; segment 3 with a yellow spot mid-ventrally ; segment 4 with a large black area enclosing a transverse, elongate yellow spot mid-ventrally and with a wide black stripe joining black area to lateral margin ; segments 5 and 6 with an arcuate black spot mid-ventrally and suffusion laterally ; segment 7 with a small piceous spot on apical margin medially. Anterior and median tibiae, posterior legs, black ; anterior and median femora narrowly black apically ; trochanters, median tibiae basally suffused with piceous ; coxae light red.

STRUCTURE. Head smooth ; anteocular laterally coarsely striate ; vertex, except medially, feebly transversely striate ; medially aciculate, basally medially more coarsely striate ; postocular with very obscure, shallow narrow depressions. Anterior pronotal lobe with a narrow, sinuate sulcus subdorsally medially ; median depression on lobes posteriorly transversely carinulate ; posterior lobe with deep foveoles and longitudinal carinulae anteriorly ; posterolateral angles of posterior lobe moderately produced, rounded apically and directed inwards feebly ; apex of scutellum broadly rounded apically and with transverse sulci. Hemelytra extending to apex of abdomen. Fossula spongiosa on anterior tibiae a little less than half as long, on median tibiae one-third as long as tibiae.

Total length, 25·00 mm.; hemelytra, 16·00 mm.; greatest pronotal width, 7·50 mm.

One ♂ (holotype), Siam (B.M. 65–13).

Tiarodes ostentans sp. n.

(Pl. 1, fig. 14)

COLOUR. Antennae missing. Head black ; anteocular laterally, gula, postocular and base yellow ; segments 1 and 2 of rostrum piceous ; segment 3 brown. Pronotum light red ; median depression between lobes, posterior half of posterior lobe of pronotum, piceous ; produced part of posterolateral angles reddish ; scutellum black ; propleura, sterna, light red ; mesosternum with an oblong black spot laterally ; meso- and metapleura black ; acetabula reddish yellow. Abdomen dark yellow ; segment 2 ventrally black ; segments 3–5 almost entirely suffused with piceous ; segment 6 with a black stripe medially on apical margin ; connexival segments 2–4 black ; segment 4 with a circular yellow spot ; segment 5 black in basal half, remainder yellow ; segments 6 and 7 yellow. Corium black and fuscous with a large pale yellow discal spot extending almost to costal margin ; membrane black. Tibiae and tarsi black ; coxae light red ; anterior trochanters light red suffused with piceous ; median and posterior trochanters piceous ; anterior and median femora light red, broadly black apically ; median femora suffused with piceous basally ; posterior femora black.

STRUCTURE. Anteocular laterally distinctly transversely striate ; ocellar area very obscurely striate. Anterior pronotal lobe with a distinct arcuate depression subdorsally ; median depression between lobes wide, deep, transversely striate ; transverse sulcus with a large, circular foveole and a small, circular foveole with external side open ; produced portion of posterolateral angles of posterior pronotal lobe thick, conical, subacute ; apex of scutellum broadly rounded ; discal foveole with surface strongly declivous ; sides of disc deeply depressed. Hemelytra extending to apex of abdomen. Fossula spongiosa a little less than half the length of tibiae.

Total length, 28·00 mm.; hemelytra, 18·00 mm.; greatest pronotal width, 9·00 mm.

One ♂ (holotype), Indo-China, Laos, Vitalis de Salvaza.

Tiarodes scriptus sp. n.

(Pl. 1, fig. 15)

Colour. Segments 1 and 2 of antennae black ; remaining segments missing. Head shining black ; gula, base of head, postocular laterally, stripes on anteocular laterally, dull yellow ; rostrum black. Anterior pronotal lobe, propleura reddish yellow, the former with lateral angles of collar almost entirely, collar and 2 large subtriangular spots coalescing anteriorly, a large subtriangular spot laterally, confluent spots along posterior margin and laterally posteriorly, black ; posterior lobe black with an oblique, elongate yellowish spot anteriorly on each side of median depression ; scutellum black with reddish yellow suffusion at apex of disc ; pleura and sterna reddish yellow ; propleura with black spot at base of acetabular incision. Hemelytra fuscous with an elongate, suffused yellowish spot basally at claval suture and a transverse subtriangular yellowish discal spot, the acute angle directed towards costa. Connexivum black ; segment 3 with a small quadrate spot, segments 4–6 with a transverse, subapical, elongate spot yellow ; segments 2–4 of abdomen ventrally reddish yellow ; segments 5–7 yellow ; pygophore yellow with brown suffusion ; segments 2–5 laterally with a large, irregular spot, segment 4 with 2 spots mid-ventrally, segments 5 and 6 with a transverse spot mid-ventrally, segment 7 with a triangular spot mid-ventrally, black ; connexivum of segment 7 ventrally suffused with yellow. Tarsi and tibiae black ; coxae, trochanters, femora, reddish yellow ; anterior and median femora broadly apically, posterior femora with apical half, black ; basal margins of black areas suffused and reddish yellow areas with somewhat obscure, linear black suffusion.

Structure. Anteocular laterally striate, the striae more or less parallel. Median depression on both pronotal lobes wide and deep, particularly on posterior lobe ; base of depression on anterior lobe with short, transverse carina ; depression on posterior lobe with a wide, deep foveole anteriorly and shorter transverse sulci posteriorly ; transverse sulcus with a large and a small deep foveole and carinulae laterally ; posterolateral angles strongly produced, triangular, acute ; apex of scutellum narrowly rounded ; disc damaged ; laterally irregularly sulcate. Hemelytra extending very little beyond apex of abdomen. Fossula spongiosa a little more than half as long as tibiae.

Total length, 27·00 mm.; hemelytra, 17·00 mm.; greatest pronotal width, 7·50 mm.

One ♂ (holotype), E. Borneo, Sanga Sanga, W. D. Jensen (B.M. 1907–203).

Tiarodes sulaensis sp. n.

(Pl. 1, fig. 16)

Colour. Basal segment of antennae piceous ; remaining segments brown. Head black, narrowly light brown basally ; gula dark yellow ; rostrum piceous. Anterior pronotal lobe dark yellow or reddish yellow with a black pattern ; posterior lobe, propleural epimeron, meso- and metapleura, scutellum shining black ; lateral angles of collar suffused with brown ; propleural epimeron dark or reddish yellow, suffused with black posteriorly ; prosternum yellow ; stridulatory furrow black ; meso- and metasternum black, the former suffused with yellow anteriorly. Segments 2–4 of abdomen black ; segment 3 narrowly ventrolaterally, segment 4 mid-ventrally with reddish yellow suffusion ; remaining segments reddish yellow with brownish suffusion mid-ventrally ; genital segments suffused with piceous. Corium fuscous somewhat paler laterally and with a small, median whitish spot ; membrane dark infumate. Tarsi light brown ; anterior and median tibiae, posterior femora and tibiae black ; anterior and median femora reddish yellow, narrowly black apically ; median femora with brown suffusion basally ; coxae and trochanters reddish yellow suffused with piceous.

STRUCTURE. Head smooth ; vertex and laterally with transverse striae which are less defined on vertex. Anterior pronotal lobe with a wide, shallow, oblique sulcus with sulci within it ; median depression on both lobes very deep and transversely carinulate ; subdorsal foveole on transverse sulcus very deep ; sulcus also with strong, transverse carinulae ; posterolateral angles of posterior lobe somewhat strongly produced, subacute, directed backwards. Apex of scutellum subacute and constricted subapically. Hemelytra extending a little beyond apex of abdomen. Segment 7 of abdomen ventrally with strong transverse sulci ; segment 6 with irregular, somewhat feeble sulci. Fossula spongiosa a little less than half as long as tibiae.

Total length, 31·00 mm.; hemelytra, 18·00 mm.; greatest pronotal width, 8·50 mm.

One ♀ (holotype), Sula.

Tiarodes acutangulus sp. n.

(Pl. 1, fig. 2)

COLOUR. Antennae piceous ; apical segments somewhat paler. Head black ; anteocular laterally, gula, postocular laterally pale yellow ; neck pale yellow, dorsally piceous anteriorly ; basal segment of rostrum piceous ; remaining segments brown. Thorax dark yellow ; anterior pronotal lobe with 2 large bilobate spots anteriorly, a semicircular spot medially laterally, a large bifurcate spot at posterolateral angles, a large elongate spot on each side of median depression and a large spot almost confluent with them, piceous. Segments 2–4 of abdomen dark yellow ; remaining segments pale yellow ; segment 2 of connexivum with external margin black ; segments 3–7 with a large, more or less triangular spot basally black ; segments 3–4 also apically narrowly black ; apical margin of segment 3 dorsolaterally narrowly black ; apical margin of segments 4–7 black ; segments 5 and 6 with an undulate piceous spot laterally ; segment 7 with piceous suffusion medially. Corium dark yellow, broadly fuscous apically ; clavus fuscous, except external margin narrowly yellow ; apical half of area between claval suture and *Cu*, base of costa, fuscous. Coxae, trochanters, femora pale yellow ; femora narrowly piceous apically ; anterior tibiae pale yellow, broadly apically, narrowly basally piceous ; median and posterior tibiae piceous ; tarsi dark brown.

STRUCTURE. Anteocular laterally with a few obscure, transverse striae. Anterior pronotal lobe with a very obscure transverse sulcus subdorsally ; median depression on lobes wide and deep with somewhat obscure transverse and oblique sulci within it ; produced part of posterolateral angles of posterior lobe very acute ; apex of scutellum rounded, subtruncate ; foveole on disc deep, subtriangular ; sides of disc almost smooth. Hemelytra extending to apex of abdomen. Fossula spongiosa a little more than half as long as tibiae.

Total length, 18·50 mm.; hemelytra, 11·50 mm.; greatest pronotal width, 5·80 mm.

One ♀ (holotype), Sarawak, foot of Mt. Dulit, junction of Rivers Tinjar and Lejok, 10.ix.1932, B. M. Hobby & A. W. Moore (Oxford Univ. Exped. B.M. 1933–254).

Tiarodes nemoralis sp. n.

(Pl. 1, fig. 3)

COLOUR. Basal segment of antennae piceous ; remaining segments testaceous ; segment 2 basally and apically narrowly piceous. Head black with faint metallic green lustre ; anteocular laterally, including antennophores, postocular laterally, base of head yellowish ; neck very narrowly piceous anteriorly ; basal segment of rostrum piceous ; remaining segments brown. Thorax dark yellow ; pleura and sterna suffused with red ; anterior pronotal lobe with a large, subtriangular spot medially laterally, a large angulate spot at posterolateral angles and 2 large spots on posterior margin, dark brown. Corium pale yellow with apex broadly fuscous, an elongate spot on clavus and on anterior part of area between claval suture and *Cu* and a stripe on costa basally, fuscous ; membrane fuscous ; venation black. Abdomen ventrally pale yellow ; segments 2–4 suffused with red ; segments 4 and 5 with a brown spot on each side of mid-venter ; connexival segments 3–7 with a spot basally, piceous. Legs pale yellow ; coxae trochanters and femora with light red suffusion ; tibiae with brown suffusion basally and apically, that on median and posterior tibiae covering nearly half of tibiae ; tarsi testaceous.

STRUCTURE. Anteocular laterally with distinct, widely-spaced transverse striae Anterior pronotal lobe with a moderately deep subcircular depression subdorsally ; median depression on lobes wide and deep ; transverse sulcus with 2 large circular foveoles ; posterolateral angles of posterior lobe narrowly conical, acute ; apex of scutellum narrowly rounded ; disc laterally with a few sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa on anterior tibiae a little more than one-third as long, on median tibiae one-third as long as tibia.

Total length, 19·00 mm.; hemelytra, 13·00 mm.; greatest pronotal width, 6·00 mm.

One ♀ (holotype), Malaya, Gunong Angsi, Negri Sembilan, 2000–2790 ft. April 1918 (B.M. 1955–354).

Tiarodes simplex sp. n.

(Pl. 4, fig. 20)

COLOUR. Segments 1 and 2 of antennae piceous ; remaining segments testaceous. Head black ; anteocular laterally, gula, yellow ; vertex adjacent to antennophores with yellow suffused spot ; neck yellow, anteriorly narrowly piceous ; basal segment of rostrum piceous ; remaining segments brown. Thorax yellow ; anterior pronotal lobe anteriorly subdorsally with a securiform spot, sublaterally with a circular spot, laterally with a pyriform spot, a large bilobate spot at posterolateral angles and 2 large circular spots posteriorly piceous. Corium pale yellow ; area between claval suture and *Cu* with brown suffusion ; apex of corium broadly piceous ; membrane black, fuscous basally ; costa basally with faint brown suffusion. Abdomen ventrally yellow ; apical margin of segments 3–7 dorsally narrowly black ; segments 5–7 with a transverse brownish stripe laterally ; connexival segments 3–7 with a wide, quadrate spot basally and apical margin narrowly black. Anterior femora and tibiae, median and posterior femora pale yellow ; tibiae basally and apically, femora apically with brown suffusion ; median and posterior femora black ; tarsi dark brown.

STRUCTURE. Postocular laterally with moderately distinct transverse striae. Anterior pronotal lobe with a small, obscure depression subdorsally ; median depression on anterior and posterior lobes wide and deep and with obscure sulci posteriorly ; transverse sulcus with a deep, circular foveole and a small, parallel-sided foveole and a shallow depression with carinulae within it laterally ; produced portion of posterolateral angles moderately thick, acute ; apex of scutellum rounded ; foveole on disc deep, transverse ; sides of disc with longitudinal sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa half as long as tibiae.

Total length, 21·00 mm.; hemelytra, 14·00 mm.; greatest pronotal width, 6·50 mm.

One ♀ (holotype), Borneo, Long Bloeoe, Mahakkam, 1898, Dr. Nieuwenhuis.

Tiarodes sumatrensis sp. n.

(Pl. 4, fig. 18)

COLOUR. Segments 1 and 2 of antennae piceous ; remaining segments missing. Head black ; anteocular laterally, antennophores, gula and postocular laterally pale yellow ; base of head broadly pale yellow ; rostrum brown. Thorax pale reddish yellow ; anterior pronotal lobe with a small spot medially laterally, an angular spot on posterolateral angles and 4 circular spots posteriorly, brown. Corium very pale or whitish yellow ; clavus fuscous except external margins narrowly whitish yellow ; area between claval suture and *Cu* with an elongate fuscous spot ; apex of corium broadly fuscous ; membrane fuscous ; venation greyish. Abdomen ventrally pale yellow ; segments 2–4 and part of 5 ventrally suffused with red ; connexival segments 3–6 with a quadrate spot basally, segment 7 with an irregular spot basally, piceous ; dorsal segments 5–7 with apical margin narrowly black. Legs pale yellow ; coxae, trochanters and femora suffused with light red ; anterior and median tibiae with a broad suffusion apically particularly on inner surface and a narrow suffusion basally, piceous ; posterior tibiae with a narrow suffusion apically and moderately wide suffusion on inner surface basally, piceous ; tarsi testaceous.

STRUCTURE. Anteocular laterally obscurely but more or less regularly transversely striate. Anterior pronotal lobe with a small, distinct, circular depression subdorsally ; median depression between lobes wide and deep with obscure, shallow, transverse and oblique sulci within it ; transverse sulcus with 2 moderately deep circular foveoles and oblique sulci laterally ; posterolateral angles of posterior lobe triangular, acute ; apex of scutellum rounded ; disc laterally with feeble longitudinal sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-half the length of tibiae.

Total length, 20·50 mm.; hemelytra, 13·50 mm.; greatest pronotal width, 6·10 mm.

One ♀ (holotype), Sumatra, ober-Langkat, Deli, 1894, M. V. de S.

Tiarodes ambulator sp. n.

(Pl. 2, fig. 16)

COLOUR. Segments 1 and 2 of antennae brown ; remaining segments testaceous. Head black with violaceous lustre ; gula brown ; base of head very narrowly dull yellow ; rostrum testaceous. Thorax, except scutellum, light red ; scutellum piceous with faint violaceous lustre. Abdomen ventrally black with metallic bluish lustre ; segment 2 entirely mid-ventrally and with anterior margin laterally dull red ; segment 3 mid-ventrally dull red ; segments 6 and 7 laterally suffused with yellow ; segment 7 with an angulate yellowish spot mid-ventrally ; connexivum piceous with violaceous lustre ; connexival segment 6 yellow except internal margin narrowly brownish. Corium fuscous, broadly light red basally ; membrane black. Tarsi testaceous ; anterior and median tibiae piceous narrowly suffused with light red apically ; posterior tibiae piceous ; coxae trochanters, femora light red ; anterior and median femora narrowly apically, posterior femora moderately broadly apically black with metallic blue lustre.

STRUCTURE. Anteocular laterally somewhat coarsely striate ; area between ocelli and transverse sulcus transversely striate. Median depression on anterior pronotal lobe narrow, deep, on posterior lobe wide and somewhat shallow ; anterior lobe posteriorly with a subtriangular flattened area on each side of depression ; transverse sulcus without distinct foveoles but with somewhat obscure transverse carinulae ; posterolateral angles of posterior lobe feebly produced, acute ; apex of scutellum narrowly rounded ; disc damaged ; sides of disc very obscurely striate. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-fifth as long as tibiae.

Total length, ♂ 14·00 mm., ♀ 16·00 mm.; hemelytra, ♂ 9·00 mm., ♀ 10·20 mm.; greatest pronotal width, ♂ 4·30 mm., ♀, 5·00 mm.

One ♂ (holotype), Sumatra, N. O. Kust, G. Martin, 1 ♀ (paratype), S. W. Lampongs, Mt. Tanggamoes, Giesting, 600 m., xii.1934, Lieftinck/Toxopeus.

Paratype in Rijksmuseum van Natuurlijke Historie, Leiden.

Tiarodes assamensis sp. n.

(Pl. 2, fig. 4)

COLOUR. Segments 1 and 2 of antennae piceous ; remaining segments missing. Head piceous with faint metallic blue lustre ; gula brown ; base of head narrowly yellow ; rostrum yellow. Thorax, except scutellum, light red ; scutellum piceous. Hemelytra and membrane black, the former broadly light red basally. Connexivum piceous, except segment 6, yellow ; abdomen with segments 2–5 ventrally light red, narrowly black with metallic blue lustre laterally; segments 6 and 7 yellow, the former suffused with light red medially, the latter piceous apically; pygophore piceous. Tarsi testaceous; tibiae black; anterior tibiae with suffusion apically, median tibiae in apical half, light red; coxae, trochanters and femora light red; femora narrowly black apically.

STRUCTURE. Anteocular more or less regularly transversely striate laterally; postocular with very obscure striae. Anterior pronotal lobe with very obscure striae on collar and a very feeble oblique depression subdorsally; median depression on both lobes wide and deep; transverse sulcus with a deep foveole on each side of depression; posterolateral angles of posterior lobe not produced, rectangular. Apex of scutellum conical. Hemelytra extending a little beyond apex of abdomen. Fossula spongiosa one-quarter the length of tibiae.

Total length, 15·00 mm.; hemelytra, 10·70 mm.; greatest pronotal width, 4·50 mm.

One ♂ (holotype), Assam, Sylhet.

Tiarodes attrahens sp. n.

(Pl. 4, fig. 5)

COLOUR. Segments 1 and 2 of antennae brown; segments 3 and 4 testaceous. Head black with faint violaceous lustre; gula dull castaneous; base of head narrowly light brown. Thorax, except scutellum, red; scutellum piceous with faint violaceous lustre. Segments 2–5 of abdomen red; remaining segments piceous with faint violaceous or greenish lustre. Corium light red; greater part of clavus apically and of area between claval suture and *Cu* fuscous suffused with yellow marginally; membrane fuscous. Tarsi testaceous; coxae light red suffused with piceous; trochanters, femora and tibiae piceous; femora somewhat darker apically.

STRUCTURE. Anteocular laterally somewhat coarsely, transversely rugulose; area between ocelli and transverse sulcus with more or less regular transverse striae. Anterior pronotal lobe at base of lateral angles of collar with short, somewhat obscure transverse carinulae; collar sublaterally with diagonal striae; median depression between lobes wide, deep and with a small, median circular foveole; transverse sulcus with a distinct, circular foveole and somewhat irregular transverse and oblique carinulae; posterolateral angles of posterior lobe not produced, rectangular; apex of scutellum rounded; discal foveole ovate with transverse and oblique carinulae within it; sides of disc with transverse sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 18·00 mm.; hemelytra, 12·00 mm.; greatest pronotal width, 6·00 mm.

One ♀ (holotype), O. Sumatra, Kananggar, 700 m., v.1925, Dammerman.

Tiarodes biroi sp. n.

(Pl. 4, fig. 1)

COLOUR. Segments 1 and 2 of antennae brown; remaining segments testaceous. Head piceous with faint violaceous lustre; base of head yellow; rostrum piceous.

Thorax and abdomen reddish yellow ; segments 6–9 piceous. Hemelytra fuscous ; corium narrowly pale yellow basally. Coxae pale reddish yellow ; trochanters, femora and tibiae piceous ; tarsi brown.

STRUCTURE. Anteocular laterally irregularly striate ; postocular in front of ocelli obscurely transversely striate. Collar with short, somewhat obscure longitudinal striae ; median depression between lobes somewhat shallow ; posterior pronotal lobe anteriorly with obscure, short, longitudinal carinulae ; transverse sulcus with 2 shallow foveoles ; scutellar spine subacute ; foveole on scutellar disc shallow, subcircular. Hemelytra extending just beyond apex of abdomen.

Total length, 10·50 mm.; hemelytra, 7·00 mm.; greatest pronotal width, 3·40 mm.

One ♀ (holotype), 4 ♀ (paratypes), New Guinea, Erina, Astrolabe Bay, Biro, '96.

Two paratypes in British Museum (N.H.), London.

Tiarodes bradleyi sp. n.

(Pl. 2, fig. 18)

COLOUR. Antennae and rostrum piceous. Head black with metallic green lustre ; base narrowly yellow. Pronotum, propleura, prosternum, light red ; meso- and metapleura and sterna black with metallic green lustre ; metasternum anteriorly with 2 large brownish spots. Abdominal segments 2–6 dorsally dark yellow ; segment 6 suffused with piceous ; connexival segments 6 and 7, segment 7 black with metallic green lustre ; segment 2 with metallic green suffusion laterally ; remaining segments black wth metallic green lustre. Corium and membrane fuscous. Mesosternum and acetabula suffused with piceous. Tibiae piceous ; femora black with metallic green lustre.

STRUCTURE. Head smooth ; anteocular laterally vermiculately striate ; area between ocelli and transverse sulcus, irregularly striate. Anterior pronotal lobe with a wide, short, deep, subquadrate foveole sub-basally ; depression on posterior pronotal lobe moderately deep ; transverse sulcus with a deep foveole on each side of depression ; posterolateral angles of posterior lobe rounded, broadly angulate ; apex of scutellum subacute ; disc transversely striate. Hemelytra extending to apex of abdomen. Femora and tibiae with abundant, short, curved, subrecumbent, forwardly directed setae. Fossula spongiosa about one-fifth as long as tibiae.

Total length, 11·00 mm.; hemelytra, 7·00 mm.; greatest pronotal width, 3·50 mm.

One ♀ (holotype), Solomon Islands, Guadalcanal, Honiara, 8–12.ix.1953 (at light), J. D. Bradley (Rennel Island Exped. B.M. 1954–222).

Tiarodes browni sp. n.

(Pl. 2, fig. 17)

COLOUR. Antennae piceous. Head and legs black with metallic green and violaceous lustre. Segments 1 and 2 of rostrum piceous ; segment 3 brown. Base of head narrowly yellow. Collar, propleura anteriorly, acetabula, prosternum, light red ; anterior pronotal lobe piceous with faint violaceous lustre ; posterior lobe reddish yellow; meso- and metapleura black with violaceous lustre; propleural epimeron reddish yellow; scutellum piceous; apex light brown. Corium blackish green; membrane black. Abdomen dorsally light brown, except connexival segments 2–5 light red; connexival segments 6 and 7 black with metallic green lustre; segment 2, except connexivum, segments 6 and 7, connexival segment 7 ventrally black with metallic green lustre; remaining segments light red.

STRUCTURE. Anteocular and postocular between ocelli and transverse sulcus transversely striate; postocular between ocelli and neck with feeble, longitudinal striae. Anterior pronotal lobe with a diagonal sulcus laterally; posterior lobe anteriorly with a feeble carina on each side of depression and short carinulae; posterolateral angles not produced, broadly rounded. Hemelytra extending just beyond apex of abdomen. Femora and tibiae with abundant, short, subrecumbent, forwardly directed setae. Fossula spongiosa about one-fifth as long as tibiae.

Total length, 11·50 mm.; hemelytra, 6·50 mm.; greatest pronotal width, 3·30 mm.

One ♀ (holotype), Solomon Islands, Malaita, Baunani, 6.ix.1954, E. S. Brown (B.M. 1958–79).

Tiarodes brunneiventris sp. n.

(Pl. 4, fig. 14)

COLOUR. Segments 1 and 2 of antennae piceous; remaining segments missing. Head black with metallic blue lustre; gula and base of head reddish yellow; segments 1 and 2 of rostrum reddish yellow; apical segment piceous. Thorax light red; posterior pronotal lobe with median brown suffusion; mesopleural epimeron with a piceous spot. Corium light red in basal half; remainder fuscous; base of clavus and part of basal area between claval suture and *Cu*, yellow; membrane blackish infumate. Abdomen dark brown ventrally, with metallic blue lustre particularly laterally; pygophore suffused with testaceous. Coxae, trochanters, femora and tibiae light red, femora apically, tibiae basally narrowly piceous; tarsi brown.

STRUCTURE. Anteocular strongly and finely reticulately rugose; postocular with feeble diagonal and transverse striae. Anterior pronotal lobe anteriorly with short, irregular longitudinal striae and with a shallow, transversely striate sulcus subdorsally medially; median depression on lobes deep; posterior lobe with a large, deep, circular foveole on each side of depression and smaller foveoles in transverse sulcus; posterolateral angles of posterior lobe not produced, broadly angulately rounded; apex of scutellum narrowly rounded; foveole on disc moderately deep and with irregular sulci within it. Hemelytra extending to apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 20·00 mm.; hemelytra, 11·50 mm.; greatest pronotal width, 6·00 mm.

One ♂ (holotype), Assam.

Tiarodes cameronicus sp. n.

(Pl. 2, fig. 23)

COLOUR. Segments 1 and 2 of antennae piceous; remaining segments missing. Head piceous with very faint bluish lustre; gula testaceous; base of head yellow; rostrum pale testaceous. Thorax, except scutellum, light red; scutellum piceous with faint bluish lustre ; apex somewhat pale. Hemelytra fuscous ; corium moderately broadly red basally. Abdomen ventrally piceous ; segment 6 laterally with a quadrate yellow area ; connexivum piceous with blue or violaceous lustre ; connexival segment 6 yellow. Tarsi brown ; tibiae piceous ; anterior and median tibiae with wide reddish brown suffusion apically ; coxae, trochanters, femora light red ; femora with narrow piceous suffusion with bluish lustre apically.

STRUCTURE. Anteocular and postocular immediately behind eyes moderately distinctly striate ; area between ocelli and transverse sulcus very obscurely striate. Anterior pronotal lobe with some very obscure oblique striae at base of collar, mostly laterally and a moderately deep, narrow, oblique sulcus subdorsally ; transverse sulcus without distinctly defined foveoles ; median depression on lobes wide and deep, but short on posterior lobe ; posterolateral angles of posterior lobe not produced, rectangular ; apex of scutellum narrowly rounded ; discal foveole ovate, moderately deep and with a smooth, elliptical, low, elevation medially. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 15·50 mm.; hemelytra, 10·00 mm.; greatest pronotal width, 4·50 mm.

One ♂ (holotype), 1 ♀ (paratype), Malaya, Boh, Cameron Highlands, 24.ix.1940, N. C. E. Miller (B.M. 1947–269).

Tiarodes celebensis sp. n.

(Pl. 3, fig. 9)

COLOUR. Segments 1 and 2 of antennae piceous ; segments 3 and 4 testaceous. Head black with very faint metallic blue lustre ; gula brown ; base of head dark yellow ; rostrum light brown. Thorax, except scutellum, light red ; scutellum piceous ; transversely striate area of metapleura suffused with brown. Corium black, moderately broadly light red basally ; membrane blackish infumate. Abdomen fuscous or black with faint blue and green metallic lustre ; connexivum of segment 6 dorsally with external half ventrally entirely yellow ; segment 6 ventrolaterally with an oblong yellow spot. Tarsi brown ; anterior tibiae dull red in apical half, remainder piceous ; median tibiae dull red suffused with piceous basally ; posterior tibiae piceous ; coxae, trochanters, femora light red, femora narrowly black apically.

STRUCTURE. Anteocular laterally and area between ocelli and transverse sulcus coarsely striate. Anterior pronotal lobe laterally at base of collar coarsely, obliquely striate ; subdorsally with a shallow, oblique sulcus ; median depression on lobes moderately wide and deep ; transverse sulcus with 2 moderately deep foveoles and short, longitudinal carinulae ; posterolateral angles of posterior lobe not produced, acute ; apex of scutellum narrowly rounded ; discal foveole circular with surface subconvex ; disc laterally obscurely transversely striate. Hemelytra extending to apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 18·00 mm.; hemelytra, 12·00 mm.; greatest pronotal width, 4·50 mm.

One ♀ (holotype), 1 ♀ (paratype), Celebes, Limbotti, July–Sept. (no year), Rosenberg.

Paratype in British Museum (N.H.), London.

Tiarodes dux sp. n.

(Pl. 3, fig. 1)

Colour. Segments 1 and 2 of antennae piceous ; remaining segments testaceous. Head black with metallic blue lustre ; gula and a spot behind eyes, reddish ; base of head yellow ; rostrum testaceous. Thorax, except scutellum, light red ; scutellum black ; metapleura with transversely striate area piceous. Corium fuscous, moderately broadly light red basally ; membrane fuscous. Abdomen piceous ; segments 6 and 7, 8, part of 9, pale yellow ; segments 6 and 7 mid-ventrally with piceous suffusion ; apical margin of segment 5 narrowly suffused with red ; connexival segments 5 and 6 dorsally with yellow suffusion. Anterior and median tibiae light red suffused with piceous basally ; posterior tibiae piceous ; coxae, trochanters, femora light red ; femora narrowly black apically.

Structure. Anteocular irregularly transversely striate laterally ; vertex basally with 2 parallel-sided smooth areas basally ; area between ocelli and transverse sulcus obscurely striate. Anterior pronotal lobe obscurely, longitudinally and obliquely striate at base of collar ; median depression on lobes deep with a transverse, deep foveole medially ; transverse sulcus with 2 deep, subcircular foveoles and longitudinal carinulae ; posterolateral angles of posterior lobe feebly produced, acute ; apex of scutellum acute and strongly transversely sulcate ; disc laterally irregularly sulcate. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 18·00 mm. ; hemelytra, 12·00 mm.; greatest pronotal width, 5·70 mm.

One ♀ (holotype), Burma, Tenasserim (Kirkaldy coll. B.M. 1912-513), 2 ♀ (paratypes), Tavoy.

Tiarodes dyak sp. n.

(Pl. 4, fig. 3)

Colour. Segments 1 and 2 of antennae brown ; segments 3 and 4 testaceous. Head piceous with faint violaceous lustre ; gula pale red ; base of head, rostrum yellow. Thorax, except scutellum light red ; scutellum piceous with violaceous lustre. Corium fuscous, moderately broadly light red basally ; membrane dark infumate. Abdomen piceous ; connexival segment 3 with a moderately wide spot, segments 4 and 5 with a very narrow, somewhat suffused spot basally, pale yellow ; connexival segment 6 pale yellow ; connexival segment 7 piceous ; segments 2 and 3 mid-ventrally with faint reddish suffusion ; segments 6 and 7 with pale yellow suffusion laterally ; segment 8 pale yellow. Tarsi brown ; tibiae piceous ; coxae, trochanters, anterior and median femora light red ; posterior femora light red, strongly suffused with piceous with violaceous lustre.

Structure. Anteocular laterally with moderately distinct, transverse striae ; transverse sulcus with obscure, transverse striae. Anterior pronotal lobe with a very narrow sulcus within a shallow depression anteriorly ; median depression between lobes somewhat narrow and deep ; transverse sulcus with 2 deep foveoles ; posterolateral angles hardly at all produced ; scutellar foveole distinctly circular, deep and with anterior two-thirds depressed ; apex of scutellum narrowly rounded. Hemelytra extending just beyond apex of abdomen ; costal margin of corium distinctly convex in apical two-thirds.

Total length, 14·50 mm.; hemelytra, 9·20 mm.; greatest pronotal width, 4·10 mm.

One ♀ (holotype), Borneo, Xantus.

Tiarodes excellens sp. n.

(Pl. 2, fig. 2)

Colour. Antennae missing. Head black with faint metallic green lustre ; gula, part of postocular laterally, dull red ; base of head, rostrum yellow. Pronotum, propleura coral red ; meso- and metapleura piceous ; acetabula light red ; scutellum dark metallic blue. Corium black, broadly red basally ; membrane fuscous. Abdomen piceous ventrally with dark metallic blue suffusion laterally ; segments 6 and 7, pygophore yellow ; connexival segments 2–5 piceous with dark metallic blue suffusion and a short, transverse yellow spot basally. Tibiae black in basal half, light red in apical half ; coxae, trochanters, femora light red ; femora narrowly black apically.

Structure. Anteocular more or less regularly transversely striate laterally ; area between ocelli and transverse sulcus somewhat flattened, feebly transversely striate. Anterior pronotal lobe with a short, longitudinal and an oblique stria at base of collar ; lobe with a very obscure oblique sulcus subdorsally ; median depression on both lobes moderately deep, that on posterior lobe obscurely, transversely striate ; posterolateral angles of posterior lobe not produced, rectangular, rounded. Apex of scutellum narrowly rounded apically ; foveole on disc deep, with irregular sulci ; sides of disc somewhat obscurely striate. Hemelytra extending a little beyond apex of abdomen.

Total length, ♂ 16·50 mm., ♀ 19·00 mm., hemelytra, ♂ 11·00 mm., ♀ 13·00 mm.; greatest pronotal width, ♂ 5·00 mm., ♀ 6·00 mm.

One ♂ (holotype), 1 ♀ (paratype), Siam, Khao Sabap, Chantaboon, 1936, J. Macbeth (B.M. 1937–24).

Tiarodes flavicans sp. n.

(Pl. 3, fig. 4)

Colour. Segments 1 and 2 of antennae piceous ; remaining segments missing. Head piceous with very faint violaceous and greenish lustre ; gula and rostrum yellow ; base of head narrowly yellow. Thorax, except scutellum, yellow ; scutellum piceous. Hemelytra fuscous with faint brownish suffusion basally. Abdomen ventrally dark brown broadly suffused with black with metallic blue lustre ; connexival segments 3–5 and 7 with a spot basally, segment 6, pale yellow ; segment 6, segment 7 partly, ventrolaterally narrowly yellow. Tarsi brown ; tibiae piceous ; coxae, trochanters anterior and median femora yellow ; femora narrowly piceous with bluish lustre apically ; posterior femora brown, darker and with bluish lustre apically.

Structure. Anteocular laterally coarsely, transversely striate ; area between ocelli and transverse sulcus obscurely transversely striate. Anterior pronotal lobe obliquely striate at base of collar and with a short oblique sulcus subdorsally; median depression on lobes wide and deep, particularly on posterior lobe; transverse sulcus with a large and a small, deep foveole and oblique striae laterally; posterolateral angles of posterior lobe moderately strongly produced, conical; apex of scutellum narrowly rounded; discal foveole moderately deep and with a longitudinal carina. Hemelytra extending very little beyond apex of abdomen. Fossula spongiosa one-quarter as long as tibiae.

Total length, 16·50 mm.; hemelytra, 10·50 mm.; greatest pronotal width, 5·00 mm.

One ♀ (holotype), Malacca (? Malaya), (B.M. 65–13).

Tiarodes gracilis sp. n.

(Pl. 2, fig. 20)

COLOUR. Segments 1 and 2 of antennae dark brown; remaining segments testaceous. Head piceous with metallic blue suffusion; gula and base yellow; rostrum yellow; segments 2 and 3 suffused with brown. Thorax, except scutellum, light red; scutellum black with bluish lustre. Hemelytra fuscous with faint reddish suffusion basally. Segments 2–5 of abdomen mid-ventrally red; laterally broadly piceous with bluish lustre; segments 6 and 7 yellow; pygophore piceous; connexival segments 2–5 with bluish lustre; segments 3–5 with a subquadrate yellow spot basally; segment 6 yellow; segment 7 piceous. Tarsi brown; tibiae piceous; femora light red; anterior and median femora moderately broadly suffused with piceous for apical two-thirds, darker and with bluish lustre apically.

STRUCTURE. Anteocular coarsely transversely striate laterally; area between ocelli and transverse sulcus obscurely transversely sulcate and with a distinct sulcus between each ocellus and eye. Anterior pronotal lobe with distinct, oblique sulci behind lateral angles of collar and with a moderately deep sulcate depression subdorsally; median depression on lobes moderately deep and with a very narrow median, longitudinal sulcus with a feebly rounded elevation at middle; sides of depression on anterior lobe with a rounded flattened area basally; transverse sulcus distinctly foveolate; posterolateral angles of posterior lobe feebly produced, acute; apex of scutellum narrowly rounded; discal foveole moderately deep and with irregular, transverse sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-fifth as long as tibiae.

Total length, 14·00 mm.; hemelytra, 9·40 mm.; greatest pronotal width, 4·20 mm.

One ♂ (holotype), Borneo, H. Donckin.

Tiarodes hageni sp. n.

(Pl. 2, fig. 3)

COLOUR. Segments 1 and 2 of antennae piceous; segments 3 and 4 testaceous. Head black; gula light red; base of head yellow; rostrum yellow. Thorax, except scutellum, coral red; scutellum piceous with violaceous lustre. Hemelytra black; corium basally moderately broadly red. Abdomen brown; segments 2 and 3 mid-ventrally suffused with red; segments 6 and 7 yellow suffused with brown mid-ventrally ; pygophore brown ; connexival segments 3–5 with bluish lustre and small yellow spot basally ; segment 6 yellow. Tarsi brown ; tibiae piceous ; coxae, trochanters, anterior and median femora light red, femora narrowly black apically ; posterior femora light red suffused with brown in apical two-thirds.

STRUCTURE. Anteocular coarsely striate laterally ; area between ocelli and transverse sulcus obscurely transversely striate. Anterior pronotal lobe at base of collar, particularly laterally, obliquely striate ; lobe with long, somewhat obscure, feebly curved sulcus subdorsally, extending almost to median depression ; foveoles on transverse sulcus subcircular, deep ; median depression on lobes wide and deep, with a narrow sulcus and a transverse foveole within it ; posterolateral angles of posterior lobe feebly produced, acute ; apex of scutellum rounded ; foveole on disc moderately deep, ovate with a transverse sulcus medially. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-fifth as long as tibiae.

Total length, ♂ 14·00 mm., ♀ 15·00 mm.; hemelytra, ♂ 9·30 mm., ♀ 9·70 mm.; greatest pronotal width, ♂ 4·30 mm., ♀ 4·50 mm.

One ♂ (holotype), 2 ♀ (paratypes), N. O. Sumatra, Tanjong Morawa, Serdang, Dr. B. Hagen.

Paratype in British Museum (N.H.), London.

Tiarodes helluo sp. n.

(Pl. 3, fig. 13)

COLOUR. Segments 1 and 2 of antennae dark brown ; segments 3 and 4 testaceous. Head black with faint green lustre ; gula, lower area of anteocular laterally, postocular laterally and base of head, rostrum, testaceous. Pronotum and propleura dark yellow ; meso- and metapleura and sterna, piceous ; scutellum black with bluish lustre ; acetabula of meso- and metathorax suffused with dark yellow. Hemelytra black ; corium with obscure yellowish suffusion basally. Abdomen ventrally dark brown with metallic bluish suffusion laterally ; segments 6 and 7 with connexivum pale yellow. Tarsi brown ; tibiae piceous ; anterior tibiae with light brown suffusion on outer surface apically ; coxae, trochanters, anterior and median femora dark yellow, femora with apex narrowly black with bluish lustre ; posterior femora dark yellow, strongly suffused with brown and with apex black with bluish lustre.

STRUCTURE. Anteocular coarsely striate laterally ; area between ocelli and transverse sulcus somewhat obscurely vermiculately striate. Collar with obscure oblique sulci ; anterior pronotal lobe with a shallow, punctate oblique sulcus subdorsally ; median depression on lobes deep, with a very narrow longitudinal sulcus within it ; medially, depression deeper and with a short, longitudinal carina ; transverse sulcus with a moderately deep subcircular and an elliptical foveole ; posterolateral angles of posterior lobe not produced, broadly rounded ; apex of scutellum narrowly rounded ; discal foveole shallow, ill-defined. Hemelytra extending to apex of abdomen ; veins of corium with short, suberect setae. Fossula spongiosa a little more than one-third as long as tibiae.

Total length, 17·00 mm.; hemelytra, 10·60 mm.; greatest pronotal width, 5·20 mm.

One ♀ (holotype), Cochin China, Tayninh, 20.viii.1923, R. Vitalis de Salvaza.

Tiarodes hilaris sp. n.

(Pl. 4, fig. 4)

COLOUR. Segments 1 and 2 of antennae piceous ; segments 3 and 4 testaceous. Head piceous with violaceous lustre ; gula reddish yellow ; base of head, rostrum yellow. Thorax, except scutellum, light red ; scutellum piceous with violaceous lustre. Hemelytra black ; corium moderately broadly dark red basally. Abdomen piceous ; connexival segments 3–5 with a transverse, quadrate yellow spot basally ; connexival segment 6 yellow ; connexival segment 7 piceous ; segments 3–5 ventrally with reddish suffusion which is somewhat obscure on segments 4 and 5 ; segments 6 and 7 yellow ; segment 7 with piceous suffusion apically. Tarsi brown ; tibiae piceous ; coxae, trochanters, anterior and median femora red, broadly piceous with violaceous lustre apically ; posterior femora red with apical two-thirds piceous with violaceous lustre.

STRUCTURE. Anteocular somewhat coarsely transversely striate ; postocular between transverse sulcus and ocelli with obscure, transverse, oblique and longitudinal striae. Anterior pronotal lobe with an oblique sulcus anteriorly ; collar, particularly at middle with distinct, short striae ; median depression between lobes deep ; transverse sulcus with 1 moderately deep foveole ; posterior lobe anteriorly with distinct carinulae and striations ; posterolateral angles moderately produced, conical, rounded ; foveole on scutellar disc wide, subcircular with transverse sulci within it ; apex of scutellum narrowly rounded ; sides of disc with short, longitudinal striae. Hemelytra extending just beyond apex of abdomen.

Total length, 15·00 mm.; hemelytra, 9·50 mm.; greatest pronotal width, 4·60 mm.

One ♀ (holotype), Borneo, Xantus.

Tiarodes insulanus sp. n.

(Pl. 3, fig. 14)

COLOUR. Segments 1 and 2 of antennae dark brown ; remaining segments missing. Head black with metallic greenish lustre ; base of head suffused with brown ; segments 1 and 2 of rostrum yellow ; apical segment brown. Thorax metallic blue. Hemelytra fuscous. Abdomen yellow. Tarsi brown ; coxae brown ; trochanters, femora and tibiae yellow ; anterior femora moderately broadly, median and posterior femora narrowly apically, piceous with bluish lustre ; tibiae narrowly piceous basally.

STRUCTURE. Anteocular laterally somewhat obscurely striate. Collar with oblique striae ; anterior pronotal lobe very obscurely depressed subdorsally ; median depression on lobes wide and deep, less deep on posterior lobe ; transverse sulcus with 1 moderately large and deep, 1 small foveole and very short transverse carinulae ; posterolateral angles very feebly produced, rectangular. Apex of scutellum somewhat broadly rounded ; discal foveole deep, subcircular, almost smooth ; lateral margins of disc without sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 20·00 mm.; hemelytra, 12·10 mm.; greatest pronotal width, 6·00 mm.

One ♀ (holotype), Philippine Islands, Imugan, 4000 ft., Nord Luzon, leg. G. Böttcher (B.M. 1949–474).

Tiarodes miles sp. n.

(Pl. 3, fig. 6)

Colour. Segments 1 and 2 of antennae dark brown ; segments 3 and 4 testaceous. Head and thorax dark metallic blue ; head basally suffused with brown ; rostrum yellow. Hemelytra fuscous. Abdomen brick red ; segment 2 mid-ventrally, segment 7 apically and genital segments suffused with black with metallic blue lustre. Tarsi testaceous ; coxae, trochanters, femora and tibiae brick red.

Structure. Anteocular laterally very obscurely aciculate ; area between ocelli and transverse sulcus obscurely transversely striate. Anterior pronotal lobe with some oblique striae at base of collar and a short, deep, oblique sulcus subdorsally ; median depression on both lobes wide and deep, that on posterior lobe widening considerably posteriorly ; transverse sulcus with a large, deep, semicircular foveole and a very small elliptical foveole ; posterolateral angles very feebly produced, broadly rounded ; apex of scutellum narrowly rounded ; discal foveole deep subcircular and almost smooth ; lateral margins of disc with longitudinal sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-third as long as tibiae.

Total length, 16·00 mm.; hemelytra, 10·70 mm.; greatest pronotal width, 5·00 mm.

One ♀ (holotype), Philippine Islands, Insel Masbate, Aroro, 11.viii.1917, leg. G. Böttcher (B.M. 1949–474).

Tiarodes mjöbergi sp. n.

(Pl. 2, fig. 8)

Colour. Segments 1 and 2 of antennae piceous ; remaining segments testaceous. Head black with greenish violaceous lustre ; gula reddish yellow ; base of head pale yellow ; rostrum dark yellow. Thorax, except scutellum, light red ; scutellum black with violaceous lustre. Hemelytra fuscous ; base of corium and clavus moderately broadly light red. Connexivum black with violaceous lustre ; segment 6 and a moderately large, quadrate basal spot on segments 2–5 yellow ; abdomen ventrally piceous with violaceous lustre ; segments 2 and 3 narrowly mid-ventrally red ; segments 4 and 5 mid-ventrally suffused with red ; segment 6 laterally with a large spot with a narrow stripe leading from it, yellow. Tibiae and tarsi piceous ; coxae, trochanters, femora light red ; anterior and median femora narrowly apically, greater part of posterior femora basally piceous with violaceous lustre.

Structure. Anteocular laterally somewhat obscurely transversely striate ; transverse sulcus minutely striate. Anterior pronotal lobe with short, oblique and longitudinal striae particularly near lateral angles of collar ; anterior lobe with a very obscure, oblique sulcus anteriorly subdorsally ; depression between lobes wide and deep ; transverse sulcus with a deep, subovate foveole and a smaller, elliptical foveole on each side of depression ; posterior lobe with a short carina adjacent to larger foveole ; posterolateral angles conical, short, acute ; apex of scutellum subacute ; discal foveole moderately large, subcircular with a transverse carinula within it. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 16·00 mm.; hemelytra, 10·30 mm.; greatest pronotal width, 4·80 mm.

One ♀ (holotype), Sarawak, Mt. Matang, E. Mjöberg.

Tiarodes mouhoti sp. n.

(Pl. 4, fig. 6)

Colour. Segments 1 and 2 of antennae piceous ; remaining segments missing. Head black with faint metallic blue lustre ; gula, lower area of anteocular immediately in front of eyes, postocular and base of head, yellow ; rostrum yellow ; segments 2 and 3 suffused with brown. Anterior pronotal lobe, propleural episternum, yellow ; acetabula, posterior pronotal lobe, propleural epimeron, reddish yellow ;[1] meso- and metapleura and sterna piceous ; scutellum black with metallic bluish lustre ; apex piceous. Corium fuscous, moderately widely reddish yellow basally ; membrane dark infumate. Abdomen piceous with metallic blue lustre ; segments 6 and 7 and genital segments yellow ; segment 7 dorsally apically, segment 8, piceous ; connexival segments 3–5 dorsally with a small, suffused yellow spot basally. Tibiae and tarsi piceous ; coxae, trochanters yellow with piceous suffusion ; anterior and median femora reddish yellow, narrowly black apically ; posterior femora brown with piceous suffusion.

Structure. Anteocular coarsely striate laterally ; area between ocelli and transverse sulcus obscurely, vermiculately striate. Anterior pronotal lobe at base of collar strongly, longitudinally and obliquely striate ; subdorsally with an obscure oblique sulcus within a shallow depression ; median depression on both lobes short, medially very deep ; foveoles on transverse sulcus subcircular, deep ; posterolateral angles of posterior lobe very feebly produced, rounded ; apex of scutellum narrowly rounded ; foveole on disc subcircular with regular, transverse sulci ; sides of disc with obscure sulci. Hemelytra extending to apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 17·00 mm.; hemelytra, 11·00 mm.; greatest pronotal width, 5·50 mm.

One ♀ (holotype), Cambodia, Mouhot. (B.M. 65–13).

Tiarodes nebulosus sp. n.

(Pl. 3, fig. 5)

Colour. Segments 1 and 2 of antennae piceous ; remaining segments testaceous. Head black with faint violaceous lustre ; gula dark yellow ; base of head very narrowly yellow ; rostrum yellow ; apical segment suffused with brown. Thorax, except scutellum, light red ; scutellum black with faint violaceous lustre. Hemelytra black ; corium with very faint reddish suffusion basally. Connexival segments, except 6, black with metallic blue lustre ; segments 3–5 with quadrate yellow spot basally, largest on segment 3 ; segments 2 and 3 of abdomen ventrally red suffused with black with violaceous lustre laterally ; segments 3 and 4 piceous ; segments

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[1] The actual colour of the pronotum was probably light but has been modified by the action of alcohol.

6 and 7 yellow, piceous mid-ventrally with metallic green lustre. Tarsi light brown; tibiae piceous; anterior and median femora light red, broadly black with violaceous lustre apically, the basal margin of black areas suffused; posterior femora piceous becoming black apically and basally narrowly suffused with red.

STRUCTURE. Anteocular laterally somewhat coarsely transversely striate; area between ocelli and transverse sulcus obscurely, vermiculately and transversely striate. Collar and base of lateral angles obliquely striate; anterior lobe with distinct, oblique sulci subdorsally; lobe posteriorly with a circular flattened area in front of large foveole on transverse sulcus; median depression on lobes with 2 subcircular, moderately deep foveoles; posterolateral angles of posterior lobe moderately produced, conical, acute; apex of scutellum narrowly rounded; discal foveole moderately deep, ovate with anterior two-thirds depressed. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 15·00 mm.; hemelytra, 10·50 mm.; greatest pronotal width, 4·50 mm.

One ♀ (holotype), 1 ♀ (paratype), E. Borneo, 50 m. Balikpapan, Mentawei R., 11.x.1950, A. M. R. Wegner, 1 ♀ (paratype), Borneo, no precise locality, Schwaner.

Paratype in British Museum (N.H.), London.

Tiarodes obscuripennis sp. n.

(Pl. 4, fig. 12)

COLOUR. Segments 1 and 2 of antennae piceous; remaining segments missing. Head piceous; gula castaneous; base of head dull yellow; rostrum testaceous. Pronotum, propleura red; meso- and metapleura and sterna piceous; scutellum black. Hemelytra black; corium obscurely suffused with dull red basally. Abdomen piceous; connexival segments 6 and 7 dorsally and ventrally yellow; segments 6 and 7 ventrolaterally yellow. Tarsi brown; anterior and median tibiae dull red suffused with piceous basally; posterior tibiae piceous; femora red, narrowly black apically.

STRUCTURE. Anteocular laterally obscurely transversely striate. Anterior pronotal lobe with short, obscure striae at base of collar and an oblique straight sulcus subdorsally; median depression on lobes very deep; transverse sulcus with 2 deep, subcircular foveoles; posterolateral angles of posterior lobe feebly produced, rectangular, rounded; apex of scutellum rounded; disc depressed but without a distinct foveole; disc laterally with feeble transverse sulci. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa a little less than one-third as long as tibiae.

Total length, 17·00 mm.; hemelytra, 10·50 mm.; greatest pronotal width, 5·00 mm.

One ♀ (holotype), Malaya, Kedah, Gurun, Dec. 1915 (B.M. 1955–354).

Tiarodes obscuripes sp. n.

(Pl. 3, fig. 11)

COLOUR. Segments 1 and 2 of antennae piceous; remaining segments missing. Head piceous with metallic blue lustre; gula and base yellow; rostrum yellow.

Thorax, except scutellum, light red; scutellum black with violaceous suffusion. Hemelytra fuscous; corium basally moderately broadly light red. Abdomen piceous; segment 2 mid-ventrally light red; connexival segments 3–5 with a moderately wide, quadrate yellow spot basally; connexival segment 6 yellow; segment 6 ventrolaterally suffused with yellow. Tarsi brown; tibiae piceous; anterior and median femora light red, broadly suffused with piceous apically; posterior femora castaneous with narrow piceous suffusion apically.

Structure. Anteocular distinctly transversely striate laterally; area between ocelli and transverse sulcus obscurely transversely striate. Anterior pronotal lobe with an oblique, shallow depression subdorsally; median depression on lobes moderately wide and deep and with a narrow longitudinal sulcus and a small median foveole within it; posterolateral angles of posterior lobe feebly produced, subacute; apex of scutellum narrowly rounded; foveole on disc moderately deep, circular. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 15·00 mm.; hemelytra, 10·00 mm.; greatest pronotal width, 4·50 mm.

One ♀ (holotype), Sarawak (B.M. 65–13).

Tiarodes propinquus sp. n.

(Pl. 2, fig. 13)

Colour. Segments 1 and 2 of antennae piceous; apical segments testaceous. Head black with violaceous lustre; gula dark yellow; base of head, rostrum, light yellow; apical segment of rostrum suffused with brown. Thorax, except scutellum, yellowish red; scutellum black with a violaceous lustre. Hemelytra fuscous; corium moderately broadly yellowish red basally. Abdomen mid-ventrally, except segments 6 and 7, reddish, broadly black with faint violaceous lustre laterally; segments 6 and 7 yellow with brown suffusion mid-ventrally; segment 7 laterally, pygophore piceous; connexival segments 3–5 black with faint violaceous lustre and a quadrate yellow spot basally. Tarsi brown; tibiae piceous; coxae, trochanters, anterior and median femora light red, femora moderately broadly black apically; posterior femora piceous with base narrowly light red.

Structure. Anteocular laterally coarsely transversely striate; area between ocelli and transverse sulcus regularly transversely striate. Anterior pronotal lobe with oblique striae behind lateral angles of collar and a very feeble oblique sulcus subdorsally; median depression on lobes wide and deep, the depression on posterior lobe with transverse sulci; transverse sulcus with 2 distinct, deep foveoles; posterolateral angles of posterior lobe feebly produced, conical, acute. Apex of scutellum rounded; discal foveole moderately deep, large, subcircular and with transverse sulci apically. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 16·00 mm.; hemelytra, 10·50 mm.; greatest pronotal width, 5·00 mm.

One ♀ (holotype), Borneo, boven Makakkom (Borneo Exped., 1894, Dr. Nieuwenhuis).

Tiarodes salvazai sp. n.

(Pl. 3, fig. 2)

COLOUR. Segments 1 and 2 of antennae piceous ; remaining segments testaceous. Head piceous with metallic green lustre ; gula, lower half of ante- and postocular red ; base of head yellow. Thorax, except scutellum, light red ; scutellum piceous with metallic blue lustre. Corium and membrane black, the former narrowly light red basally. Segments 1–5 of abdomen ventrally red, narrowly and irregularly piceous with metallic blue lustre laterally ; segments 6 and 7 and pygophore yellow ; connexival segments 2–5 piceous with metallic blue lustre. Tarsi testaceous ; anterior tibiae piceous in basal half, light red in apical half ; median tibiae light red with narrow piceous suffusion basally ; posterior tibiae piceous ; coxae, trochanters, femora light red ; femora narrowly black apically.

STRUCTURE. Anteocular more or less regularly transversely striate. Median depression on anterior pronotal lobe short, deep ; on posterior lobe short and somewhat shallow ; transverse sulcus with a large and small foveole ; posterolateral angles of posterior lobe not produced, subrectangular. Apex of scutellum narrowly rounded, declivous. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, ♂ 16·00 mm., ♀ 17·00 mm.; hemelytra, ♂ 10·50 mm., ♀ 10·00 mm.; greatest pronotal width, ♂ 5·00 mm., ♀ 5·20 mm.

One ♂ (holotype), Indo-China, Tonkin, Hoabinh, June 1917, 1 ♂ (paratype), Laos, Vientiane, 20.x.1919, 1 ♀ (paratype), Laos, Na Hoi, 12.iii.1920, R. V. de Salvaza.

Paratype in British Museum (N.H.), London.

Tiarodes schultzei sp. n.

(Pl. 2, fig. 22)

COLOUR. Segments 1 and 2 of antennae piceous ; segments 3 and 4 testaceous. Head dark metallic blue, narrowly brown basally ; rostrum yellow. Thorax metallic blue. Hemelytra fuscous. Abdomen dark yellow ; pygophore black with faint bluish lustre. Legs dark yellow.

STRUCTURE. Anteocular somewhat coarsely transversely striate. Anterior pronotal lobe with obscure striae at base of lateral angles of collar ; lobe with distinct, oblique, narrow sulcus subdorsally ; median depression on lobes wide and deep and with a median foveole ; transverse sulcus with a shallow, subcircular and an ovate foveole ; posterolateral angles of posterior lobe moderately produced, conical, acute ; apex of scutellum narrowly rounded ; discal foveole deep, circular, smooth. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-third as long as tibiae.

Total length, ♂ 14·00 mm., ♀ 17·50 mm.; hemelytra, ♂ 10·00 mm., ♀ 10·00 mm.; greatest pronotal width, ♂ 4·50 mm., ♀ 5·50 mm.

One ♂ (holotype), Philippine Islands, Polillo Island, W. Schultze, 1 ♂ (paratype), Mt. Balusan, 2000 ft. S. Luzon, leg. G. Böttcher, 1 ♀ (paratype), Panay Capiz, Jamendan, W. Schultze, 1 ♀ (paratype), Montalban, Luzon Rezal, W. Schultze, 1 ♀ (paratype), Nord Luzon, Los Baños, leg. G. Böttcher (B.M. 1949–474).

The holotype differs in a very minor degree from the paratype from Mt. Balusan, but the differences, in my opinion, do not justify the setting up of another new species.

Tiarodes servus sp. n.

(Pl. 3, fig. 8)

COLOUR. Segments 1 and 2 of antennae piceous; segments 3 and 4 testaceous. Head black with very faint metallic violaceous suffusion mainly on postocular; gula suffused with brown; base of head yellow; rostrum yellow. Thorax, except scutellum, light red; scutellum black with faint violaceous lustre. Hemelytra fuscous; corium narrowly dark red basally. Segments 2–5 of abdomen ventrally brick red, broadly black with metallic greenish blue lustre laterally; segment 6 yellow suffused with brown mid-ventrally; segment 7 piceous with metallic blue suffusion; connexivum piceous with metallic blue suffusion; connexival segment 6 yellow. Tarsi brown; anterior and median tibiae piceous broadly suffused with dull red apically; posterior tibiae piceous; coxae, trochanters and femora light red; anterior and median femora narrowly, posterior femora moderately broadly black apically.

STRUCTURE. Anteocular laterally transversely striate; postocular with vermiculate striae, more distinct behind ocelli and eyes laterally. Anterior pronotal lobe with distinct oblique striae at base of lateral angles of collar and with a moderately deep, short, oblique, subarcuate sulcus subdorsally; median depression on lobes deep and wide and with a short, transverse, elliptical foveole medially; transverse sulcus with 2 moderately deep foveoles; posterolateral angles of posterior lobe feebly produced, subacute; apex of scutellum rounded; foveole on disc ovate, deep, with a transverse depression near apex; sides of disc transversely sulcate. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 17·00 mm.; hemelytra, 10·00 mm.; greatest pronotal width, 4·80 mm.

One ♀ (holotype), Sumatra, Forbes (B.M. 1911–383).

Tiarodes similis sp. n.

(Pl. 2, fig. 15)

COLOUR. Segments 1 and 2 of antennae piceous; remaining segments missing. Head black with distinct metallic blue lustre; gula dull red; base of head yellowish; rostrum yellow; apical segment suffused with brown. Thorax, except scutellum, light red; scutellum piceous with bluish lustre. Hemelytra black with dull red suffusion basally; segments 2 and 3 of abdomen ventrally red; remaining segments dark brown; segment 6 laterally and segment 8 with yellow suffusion; connexivum piceous with bluish lustre; connexival segment 6 yellow. Tarsi brown; tibiae piceous; anterior and median tibiae with faint reddish brown suffusion apically; coxae, trochanters, femora light red, femora with piceous suffusion with bluish lustre apically.

STRUCTURE. Anteocular laterally moderately coarsely transversely striate; vertex basally with 2 small, smooth, very shallow depressions; area between ocelli and transverse sulcus more or less regularly, but feebly striate. Anterior pronotal lobe with obscure, oblique striae anteriorly and a very shallow, oblique depression subdorsally; median depression on lobes moderately wide and deep; transverse sulcus with 2 not very well defined foveoles; posterolateral angles of posterior lobe subrectangular, not produced; apex of scutellum narrowly rounded; discal foveole moderately deep, ovate and with a transverse carinula subapically. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 14·50 mm.; hemelytra, 9·50 mm.; greatest pronotal width, 4·30 mm.

One ♀ (holotype), Malaya, Kuala Lumpur, Feb. 1940, N. C. E. Miller (B.M. 1947–269).

Tiarodes timorensis sp. n.

(Pl. 3, fig. 10)

COLOUR. Segments 1 and 2 of antennae piceous; remaining segments missing. Head dull black with metallic blue lustre; gula and base of head brownish; rostrum piceous. Pronotum, propleura light red; scutellum, meso- and metapleura black with violaceous lustre; acetabula light red. Corium and base of clavus narrowly light red; remainder of clavus, membrane fuscous. Abdomen light red; segment 7 ventrally, connexival segment 7 and genital segments piceous. Tibiae and tarsi black; coxae, trochanters, femora light red; femora narrowly black apically.

STRUCTURE. Anteocular laterally vermiculately striate; postocular obscurely and irregularly striate and with a narrow sulcus between each ocellus and eye. Depression on anterior and posterior pronotal lobes shallow and with a very narrow median longitudinal sulcus; foveoles on transverse sulcus deep; posterolateral angles of posterior lobe very feebly produced, rounded; scutellum apically rounded and somewhat curved downwards; disc laterally with deep, transverse sulci; foveole on disc moderately deep and with irregular sulci. Hemelytra extending just beyond apex of abdomen; corium with sparse, short, suberect setae. Femora with wide, smooth, shallow, parallel-sided sulcus on lower surface; fossula spongiosa about one-quarter the length of tibiae.

Total length, 19·00 mm.; hemelytra, 12·00 mm.; greatest pronotal width, 5·00 mm.

One ♀ (holotype), Timor, Doherty (B.M. 1911–383).

Tiarodes varipennis sp. n.

(Pl. 2, fig. 24)

COLOUR. Segments 1 and 2 of antennae piceous; segments 3 and 4 testaceous. Head piceous with metallic blue lustre; base of head yellow; gula reddish brown; rostrum light red. Thorax, except scutellum, light red; scutellum reddish brown with bluish lustre. Corium light red, broadly suffused with black apically; clavus, except base narrowly, greater part of area between claval suture and *Cu*, base of anal area of membrane, base of internal cell of membrane, dull yellow ; membrane infumate. Segments 2–5 of abdomen ventrally light red with piceous suffusion on segments 3–5 laterally ; segment 6, greater part of segment 7 basally yellow ; remainder of segment 7, connexivum of segment 7, pygophore, piceous ; connexivum of remaining segments red, strongly suffused with piceous. Coxae, trochanters, femora and tibiae light red ; tarsi testaceous.

STRUCTURE. Anteocular moderately coarsely transversely striate ; postocular regularly striate between ocelli and transverse sulcus. Anterior pronotal lobe with deep, short, arcuate sulci immediately behind collar laterally and a subarcuate, moderately deep sulcus subdorsally ; median sulcus on both lobes wide and deep, extending for about two-thirds of length of lobes ; foveoles on transverse sulcus deep ; posterolateral angles of posterior lobe not produced, rectangular, rounded ; apex of scutellum narrowly rounded ; foveole on disc deep, subtriangular, almost smooth. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa one-fifth the length of tibiae.

Total length, 13·50 mm.; hemelytra, 9·00 mm.; greatest pronotal width, 4·00 mm.

One ♂ (holotype), Sumatra, Sibolangit, Lörtling.

Tiarodes vexillarius sp. n.

(Pl. 4, fig. 2)

COLOUR. Segments 1 and 2 of antennae piceous ; segments 3 and 4 testaceous. Head piceous with faint metallic green lustre ; gula, base of head, rostrum, yellow. Thorax, except scutellum, light red ; scutellum piceous with violaceous lustre. Corium black with external area fuscous and base moderately broadly reddish yellow. Abdomen piceous ; connexival segments 3, 4 and 5 with a moderately large, quadrate spot basally pale yellow ; connexival segment 6 pale yellow with inner margin suffused with piceous ; connexival segment 7 piceous ; segments 2 and 3 of abdomen ventrally almost entirely suffused with red ; segment 6 with a triangular spot laterally, segment 7 with faint suffusion, pale yellow. Tarsi brown ; tibiae piceous ; coxae, trochanters, anterior and median femora light red, moderately broadly piceous with faint bluish or greenish lustre apically ; posterior femora light red broadly suffused with piceous with bluish lustre apically.

STRUCTURE. Anteocular laterally somewhat coarsely, regularly transversely striate ; transverse sulcus with very short, longitudinal striae ; area between sulcus and ocelli obscurely striate ; postocular from ocelli to eyes laterally with a narrow sulcus. Anterior pronotal lobe with a moderately deep, oblique sulcus and depression anteriorly ; median depression between lobes deep and with a somewhat obscure median foveole ; transverse sulcus with 1 large and 1 small foveole ; posterolateral angles moderately produced, subacute ; apex of scutellum narrowly rounded ; scutellar foveole broad, oval. Hemelytra extending to apex of abdomen.

Total length 16·00 mm.; hemelytra, 10·00 mm.; greatest pronotal width, 4·90 mm.

One ♀ (holotype), 1 ♀ (paratype), Borneo, Xantus.

Paratype in British Museum (N.H.), London.

Tiarodes vilis sp. n.

(Pl. 3, fig. 16)

COLOUR. Segments 1 and 2 of antennae piceous; segments 3 and 4 testaceous. Head black with a metallic green lustre; gula, part of lower area of anteocular, postocular, reddish yellow; base of head yellow; rostrum testaceous. Pronotum, propleura, light red; meso- and metapleura and sterna piceous with violaceous lustre; acetabula light red; scutellum piceous or black with violaceous lustre. Hemelytra fuscous; base of corium moderately broadly dull red. Abdomen ventrally castaneous, broadly suffused with piceous laterally; segments 6 and 7 and pygophore yellow; connexivum black with very faint metallic green lustre; segments 3–5 with a quadrate yellow spot basally. Tarsi brown; tibiae piceous; anterior and median tibiae suffused with red apically; coxae, trochanters and femora light red; anterior and median femora narrowly apically, posterior femora broadly apically suffused with black with a metallic green lustre.

STRUCTURE. Anteocular somewhat coarsely transversely striate laterally; area between ocelli and transverse sulcus obscurely transversely striate. Anterior pronotal lobe with oblique striae, particularly laterally at base of collar; lobe with a very obscure, oblique, narrow sulcus subdorsally; median depression on lobes wide and deep and with a transverse median foveole; transverse sulcus with 2 deep, subcircular foveoles; posterolateral angles of posterior lobe very feebly produced, acute; apex of scutellum narrowly rounded; foveole on disc moderately deep, with a transverse sulcus. Hemelytra extending just beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibiae.

Total length, 16·00 mm.; hemelytra, 11·00 mm.; greatest pronotal width, 5·00 mm.

One ♂ (holotype), Indo-China, Luang Prabang, Nuong You, 29.xi.1918, R. V. de Salvaza.

Tiarodes luzonicus sp. n.

(Pl. 4, fig. 16)

COLOUR. Basal segment and segments 3 and 4 of antennae testaceous; segment 2 brown. Head, pronotum, scutellum, pleura, prosternum, scarlet; rostrum reddish yellow; meso- and metapleura and sterna piceous; mesosternal epimeron and acetabula, metapleural acetabula reddish; mesosternum suffused with red anteriorly. Hemelytra black; corium with base narrowly suffused with crimson and a little more than half apically crimson. Abdomen with segments 2–5 crimson; remaining segments black. Tarsi reddish yellow; coxae, trochanters, femora and tibiae light red.

STRUCTURE. Anteocular laterally smooth with obscure striae on upper margin and more distinct, vermiculate striae on lower margins laterally. Anterior pronotal lobe very obscurely striate anteriorly and with a moderately distinct, short, oblique sulcus subdorsally; median depression between lobes moderately wide and deep, becoming shallower on posterior lobe, with a very narrow median, longitudinal sulcus and a short, transverse, wider sulcus medially; transverse sulcus between lobes with a large, subcircular foveole, a much smaller, ovate foveole and a short, shallow, oblique depression ; posterolateral angles of posterior lobe short, conical, acute, directed backwards. Hemelytra extending a little beyond apex of abdomen. Fossula spongiosa about one-quarter as long as tibia.

Total length, 15·50 mm.; hemelytra, 10·50 mm.; greatest pronotal width, 4·50 mm.

One ♂ (holotype), 2 ♂ (paratypes), Philippine Islands, Balbulan, N. Luzon, 4000 ft., 1 ♂ (paratype), Imugan, N. Luzon, 4000 ft., leg. G. Böttcher (B.M. 1949–474).

One paratype in Naturhistoriska Riksmuseet, Stockholm.

This new species does not differ very greatly from *Tiarodes cruentus* Stål and it was with some hesitation that I decided to consider it a distinct species. The principal differences are, the relatively longer basal and second antennal segments, the former extending to the apex of the head, the relatively longer head, much thicker lateral angles of collar, less deep transverse sulcus on head and larger ocelli, larger foveoles on transverse sulcus. The coloration is different in that the hemelytra are black, not fuscous and the base of the corium is very narrowly suffused with red.

PIRATINAE

The genus ***CATAMIARUS***[1] Amyot & Serville

The genus *Catamiarus* was established by Amyot & Serville (1843, *Hist. nat. Ins. Hémipt.*, p. 323) for the species *brevipennis* which had been assigned to the genus *Pirates* (*Peirates*) by Serville (1831, *Ann. scien. nat.*, p. 3).

The generic diagnosis and description of the species *brevipennis* given by Amyot & Serville (loc. cit.), are not adequate. Distant (1904, *Fauna Brit. India, Rhyn.* **2** : 302–303) also gives a description and figures of *C. brevipennis*. Since neither of these is satisfactory I redescribe and figure the species.

In 1877, Distant (*Entom. Month. Mag.* **14** : 134) described a new species—*nyassae*—which he placed in *Catamiarus*. Since this was incorrect and there is no other known genus appropriate for its reception, I propose a new genus—*Pteromalestes*.[2]

Nothing apparently is known about the habits of *C. brevipennis*. A reference to *Pteromalestes nyassae* (under *Catamiarus*) is given in Notes on the Biology of the Reduviidae of Southern Rhodesia (Miller, 1953, *Trans. zoo. Soc. Lond.* **28**, pt. VI : 590–591).

Catamiarus Amyot & Serville

Basal segment of antennae shorter than anteocular ; antennophores nearer to eyes than to apex of head ; anteocular longer than postocular ; transverse sulcus arcuate ; vertex with a short, median, longitudinal sulcus ; ocelli relatively large, widely separated ; interocellar area sulcate, basal segment of rostrum shorter than segment 2, somewhat compressed laterally. Anterior lobe of pronotum longer than posterior lobe ; lateral angles of collar produced ; lobe abundantly tuberculate ; posterior lobe strongly rugose, tuberculate ; propleura tuberculate ; meso- and metapleura granulose ; scutellum as wide as long, produced apically ; hemelytra variable in length. Fossula spongiosa on anterior and median tibiae ; coxae tuberculate anteriorly ; femora with low, setigerous tubercles on lower surface.

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[1] *χατὰ* = very, *μιαρος* = bad.

[2] *πτέρωμα* = feathered, *λῃότης* = thief.

Catamiarus brevipennis (Serv.)

(Text-figs. 28–35)

COLOUR. Basal segment of antennae piceous ; remaining segments brown. Head and thorax black ; abdomen and legs piceous. Corium fuscous with a large yellow discal circular spot ; membrane yellow in basal half, fuscous in remainder ; anal margin with a very narrow, yellow stripe.

STRUCTURE. Basal segment of antennae feebly curved, about two-thirds as long as segment 2. Ocellar interspace one and a third wider than an ocellus. Tubercles on anterior pronotal lobe of various sizes, mostly subcircular and ovate, flattened. Scutellar spine horizontal, rounded apically. Fossula spongiosa on anterior and median tibiae half as long as tibia.

Total length, ♂ 20–24·00 mm., ♀ 27·00 mm.; hemelytra, ♂ 6·50–10·50 mm., ♀ 10·20–10·50 mm.; greatest pronotal width, ♂ 8·00 mm., ♀ 8·00 mm.

S. India, 1 ♂, 1 ♀, Madras, Major Sale, 1 ♂, Madras (B.M. 1911–383), 1 ♂, Madras, W. Elliott, 1 ♂, Cutch (B.M. 1911–383), 2 ♂, Hardwar (B.M. 1911–383), 1 ♀, Kachli, 1 ♂, 1 ♀, Dohnavur, Tinevelly dist. 350 ft., 30.x.1938, 1.x.1938 (B.M. Colombo Mus. Exped. Sept-Oct. 1938), 1 ♀, Kolpatti, Tinevelly, 21.x.1913 (B.M. 1930–599).

Ovum (text-fig. 36). Subampulliform. Chorion glabrous with filaments curved inwards apically on apical margin ; operculum (text-figs. 37–38) concave with a cylindrical elevation constricted medially on upper surface ; margin with filaments curving inwards apically. Chorion apparently dark yellow ; filaments and operculum whitish, 3·50 mm. (dissected).

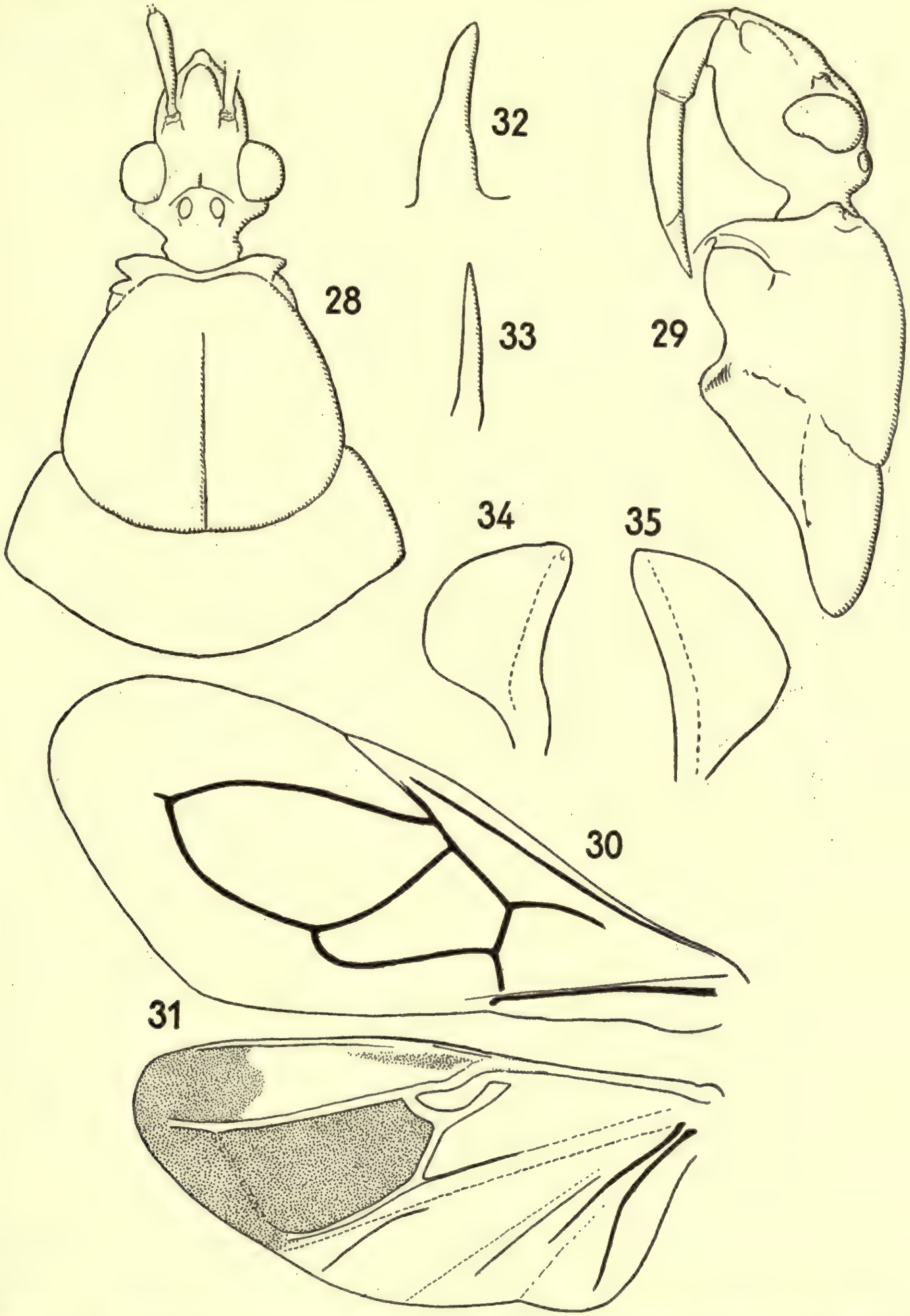
Fourth Instar Neanide (Text-fig. 39)

COLOUR. Head and thorax black. Antennae and legs piceous. Intersegmental areas between nota and pleura, segment 1 of abdomen, testaceous ; connexival segments dorsally testaceous or yellowish, narrowly shining black apically and laterally ; ventrally broadly shining black apically ; segments 2–7 of abdomen dorsally fuscous with 2 small shining black depressions on each segment ; segment 8 shining black, laterally testaceous infumate ; segment 9 shining black ; abdomen ventrally testaceous infumate with a shining black, shallow depression adjacent to spiracles. Mesosternum black with a wide, median whitish stripe ; metasternum almost entirely testaceous.

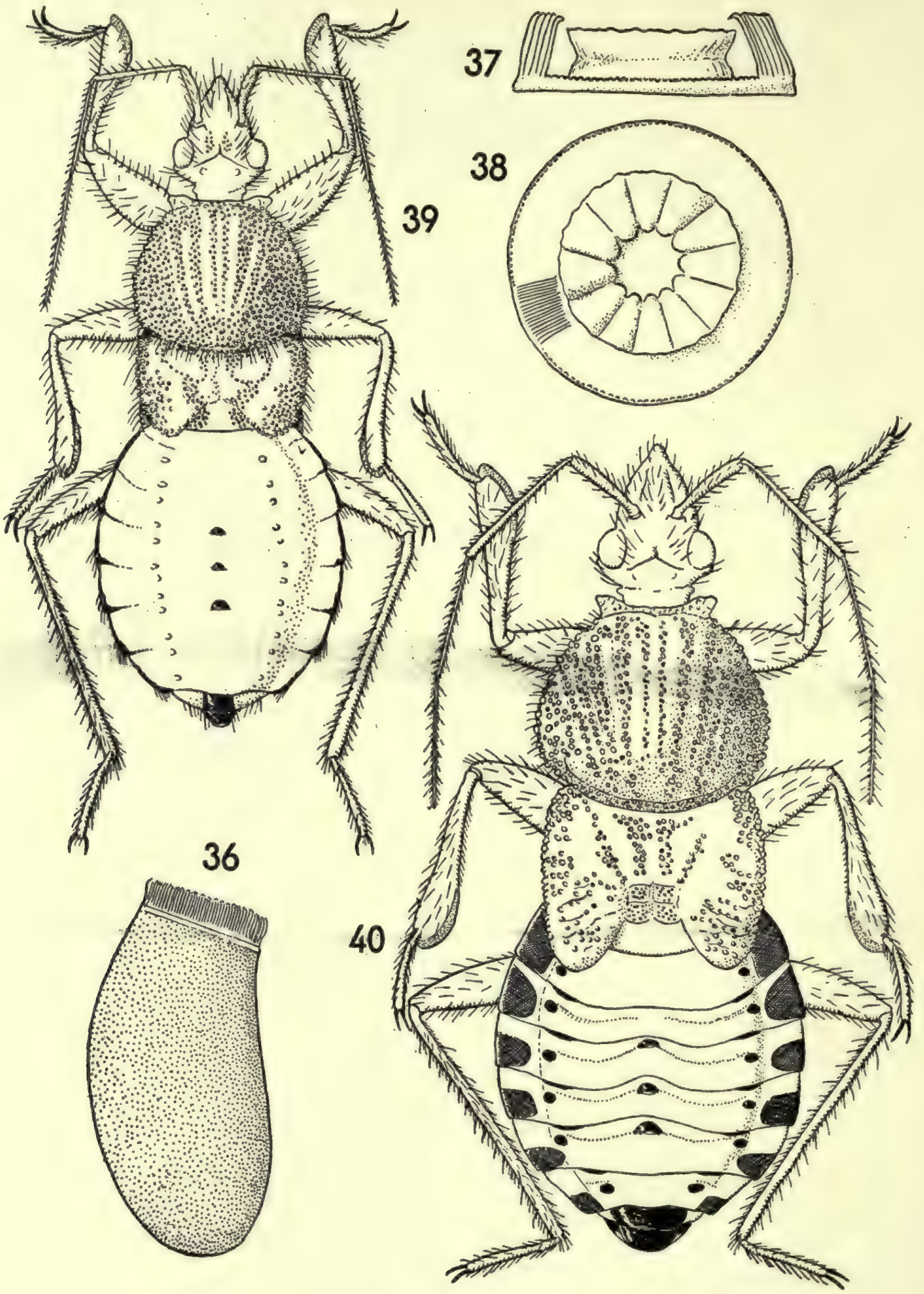
STRUCTURE. Vertex with a few shining granules. Stridulatory furrow and fossula spongiosa developed ; ostioles of dorsal abdominal glands at base of segments 4, 5 and 6. Anterior coxae anteriorly and lower inner surface of anterior femora with low, setigerous tubercles. Rudimentary hemelytra extending just beyond base of first abdominal segment.

Total length, 15·00 mm.

S. India, Bangalore (B.M. 1900–63).



FIGS. 28–35. *Catamiarus brevipennis* (Serville). (28) Head and pronotum, dorsal view. 29. *Idem*, lateral view. (30) Hemelytron. (31) Metathoracic wing. (32) Apical process of pygophore, terminal view. (33) *Idem*, lateral view. (34) Right harpago. (35) Left harpago.



FIGS. 36–40. *Catamiarus brevipennis* (Serville). (36) Ovum. (37) Operculum, lateral view (some filamentous processes removed). (38) *Idem*, lateral view. (39) Fourth instar neanide. (40) Fifth instar neanide.

Fifth Instar Neanide (Text-fig. 40)

COLOUR. Similar to fourth instar. Differs in having the thorax and rudimentary hemelytra dark brown, the tubercles black, the metanotum entirely black and granular, the abdomen ventrally testaceous with a broad, lateral infumate suffusion, segments 7 and 8 with a transverse, smooth, shining brown area, segments 1 and 2 dorsally and connexival segments pale yellow, connexival segments with apical half dark brown and with a dense clothing of pale yellow, recumbent setae.

STRUCTURE. The principal differences from the fourth instar neanide are, the tubercles on the pronotum are relatively fewer and more widely spaced and the rudimentary hemelytra extend to the middle of the second abdominal segment.

Total length, 20·00 mm.

S. India, Mysore, H. K. Slater (B.M. 1901–182–), S. India, Bangalore (B.M. 1903–63).

Catamiarus championi sp. n.

(Text-figs. 41–48)

COLOUR. Antennae missing. Head, body and legs black ; harpagones piceous. Corium black ; area between claval suture and *Cu* with a large, pale yellow spot with marginal fuscous suffusion ; membrane fuscous, becoming dark infumate apically and with a wide, transverse stripe and a narrow stripe on anal margin, pale yellow.

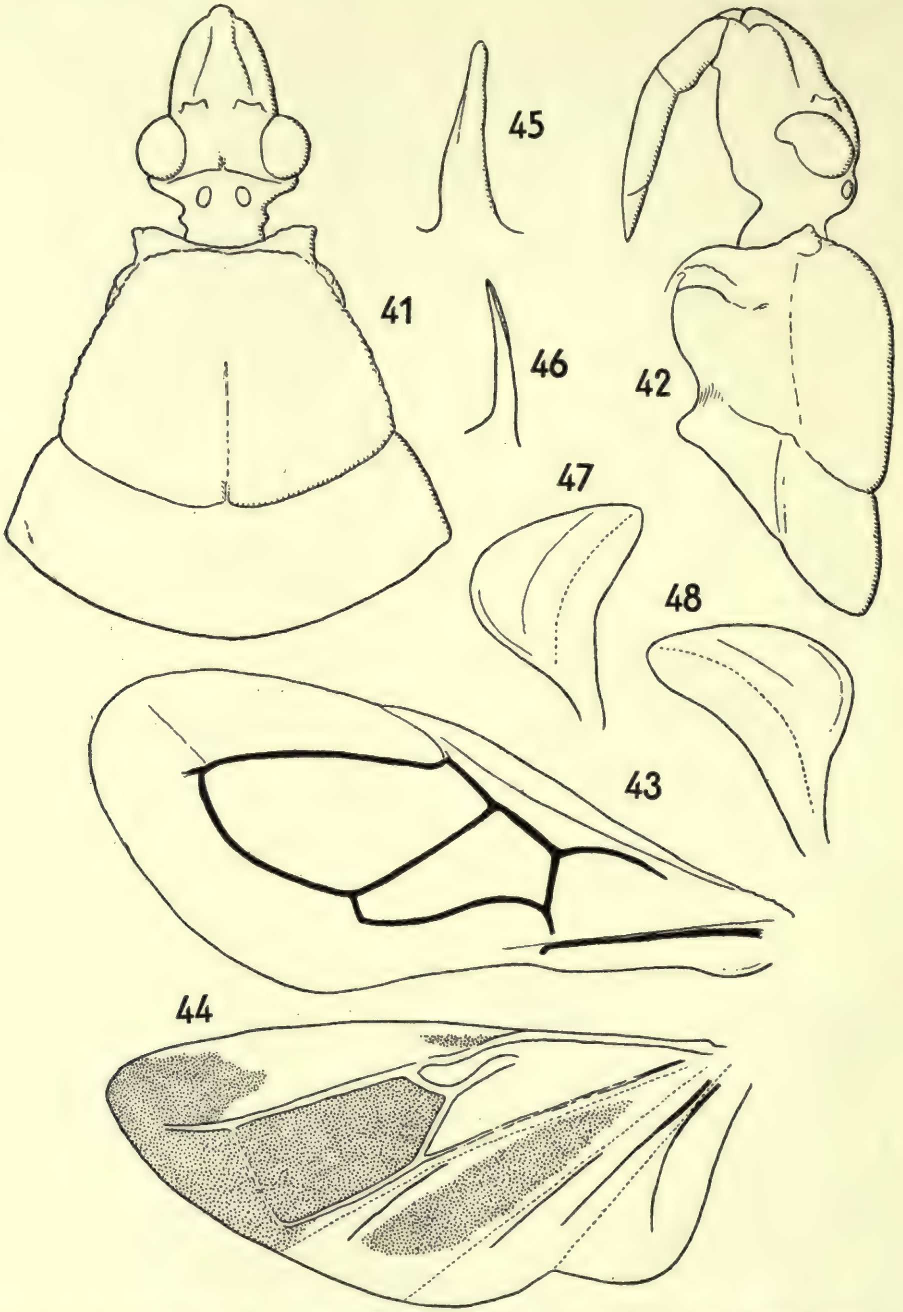
STRUCTURE. Closely resembles *Catamiarus brevipennis*, but differs in the shape of the anterior pronotal lobe which, posteriorly, is relatively wider, in the shape of the venation of the membrane and in the shape of the harpagones and of the apical process of the pygophore. The yellow spot and transverse stripe on the membrane are paler. The hemelytra extend to the apex of the abdomen and the humeral angles are rectangular with the angle rounded.

Total length, 21·50 mm.; hemelytra, 13·00 mm.; greatest pronotal width, 7·50 mm.

One ♂ (holotype), India, Haldwani dist. Kumaon, H. G. Champion (B.M. 1927–409).

PTEROMALESTES gen. nov.

Basal segment of antennae shorter than anteocular. Head shorter than pronotum ; anteocular longer than postocular, the latter abruptly narrowed to neck ; antennophores nearer to eyes than to apex of head ; transverse sulcus angulate ; vertex medially, longitudinally sulcate basally ; ocelli moderately widely separated, not elevated ; basal segment of rostrum shorter than segment 2 and somewhat laterally compressed. Anterior pronotal lobe laterally carinate, longer than posterior lobe, with a median, longitudinal sulcus for three-quarters of basal length, with obsolescent, flattened carinae and some punctures between carinae ; lateral angles of collar rounded ; posterior lobe coarsely rugose ; scutellum as long as wide with apex produced ; prosternum acutely produced posteriorly ; propleura smooth ; propleural acetabula, meso- and metapleura finely shagreened ; mesosternum with a median, longitudinal carina. Abdomen smooth, feebly striate ventrolaterally. Hemelytra not extending to apex of abdomen ; base of internal cell of membrane wider than



Figs. 41–48. *Catamiarus championi* sp. n. (41) Head and pronotum, dorsal view. (42) *Idem*, lateral view. (43) Hemelytron. (44) Metathoracic wing. (45) Apical process of pygophore, terminal view. (46) *Idem*, lateral view. (47) Right harpago. (48) Left harpago.

base of external cell ; internal cell with veins parallel and a little more than half as long as external cell. Anterior coxae long, flattened on outer surface ; anterior femora somewhat incrassate ; fossula spongiosa on anterior and median tibiae. Head, anterior lobe of pronotum, sterna, pleura, corium abdomen ventrally, connexival segments and segment 8 dorsally, legs, except outer surface of anterior coxae with adpressed, silvery, sericeous setae and suberect simple setae ; posterior pronotal lobe, scutellum with abundant, somewhat coarse suberect setae.
Type species, *Pteromalestes nyassae* (Distant). Text-figs. 49–56.

Pteromalestes nyassae (Distant)

COLOUR. Piceous. Posterior pronotal lobe castaneous. Basal segment of antennae piceous ; remaining segments reddish brown. Hemelytra fuscous, basally suffused with castaneous ; membrane dark infumate.

STRUCTURE. Basal antennal segment somewhat curved a little more than half as long as segment 2. Ocellar interspace equal to space between an ocellus and an eye. Scutellar spine horizontal, thick, rounded apically. Hemelytra extending to apex of eighth abdominal segment. Fossula spongiosa on anterior tibiae more than half as long, on median tibiae half as long as tibia.

Total length, ♂ 14·00 mm., ♀ 18·00 mm.; hemelytra, ♂ 10·00 mm., ♀ 11·50 mm.; greatest pronotal width, ♂ 4·50 mm., ♀ 5·00 mm.

One ♀ (holotype), Nyasaland (no precise locality), Symons (B.M. 1911–383), 1 ♂, Uganda, plains NE. of Lake Edward, 3200 ft., 15–16.x.1911, S. A. Neave (B.M. 1912–193), 1 ♂, Kenya, Kisumu, i.1919, T. J. Anderson (B.M. 1921–50), 1 ♀, S. Rhodesia, Odzi dist. 11.ii.1949, N. C. E. Miller.

Pteromalestes differs from *Catamiarus* in having abundant adpressed pubescence on head, body and legs, the anterior pronotal lobe obscurely carinate and punctate, not tuberculate, the base of the internal cell of the membrane subequal in width and not more than twice as wide as base of internal cell. It differs also in the somewhat narrow habitus in the relatively longer fossula spongiosa on the anterior tibiae and in not having setigerous tubercles on the lower surface of the anterior femora.

Subfamily ECTRICHODIINAE

COLASTOCORIS gen. nov.[1]

SIZE. Small. Antennae with 6 segments ; basal segment as long as head ; segment 2 subequal in length to basal segment. Head shorter than pronotum ; vertex wider than an eye ; ocelli moderately large, elevated, not very widely separated ; transverse sulcus behind eyes ; basal segment of rostrum shorter than segment 2. Anterior pronotal lobe shorter than posterior lobe, transverse, medially longitudinally sulcate throughout ; lateral angles of collar not produced ; posterior lobe medially and laterally sulcate, the sulci foveolate ; transverse sulcus foveolate ; anterior margin of mesopleura carinate and foveolate ; scutellum with 2 widely separated apical spines ; mesosternum medially longitudinally sulcate ; metasternum broadly,

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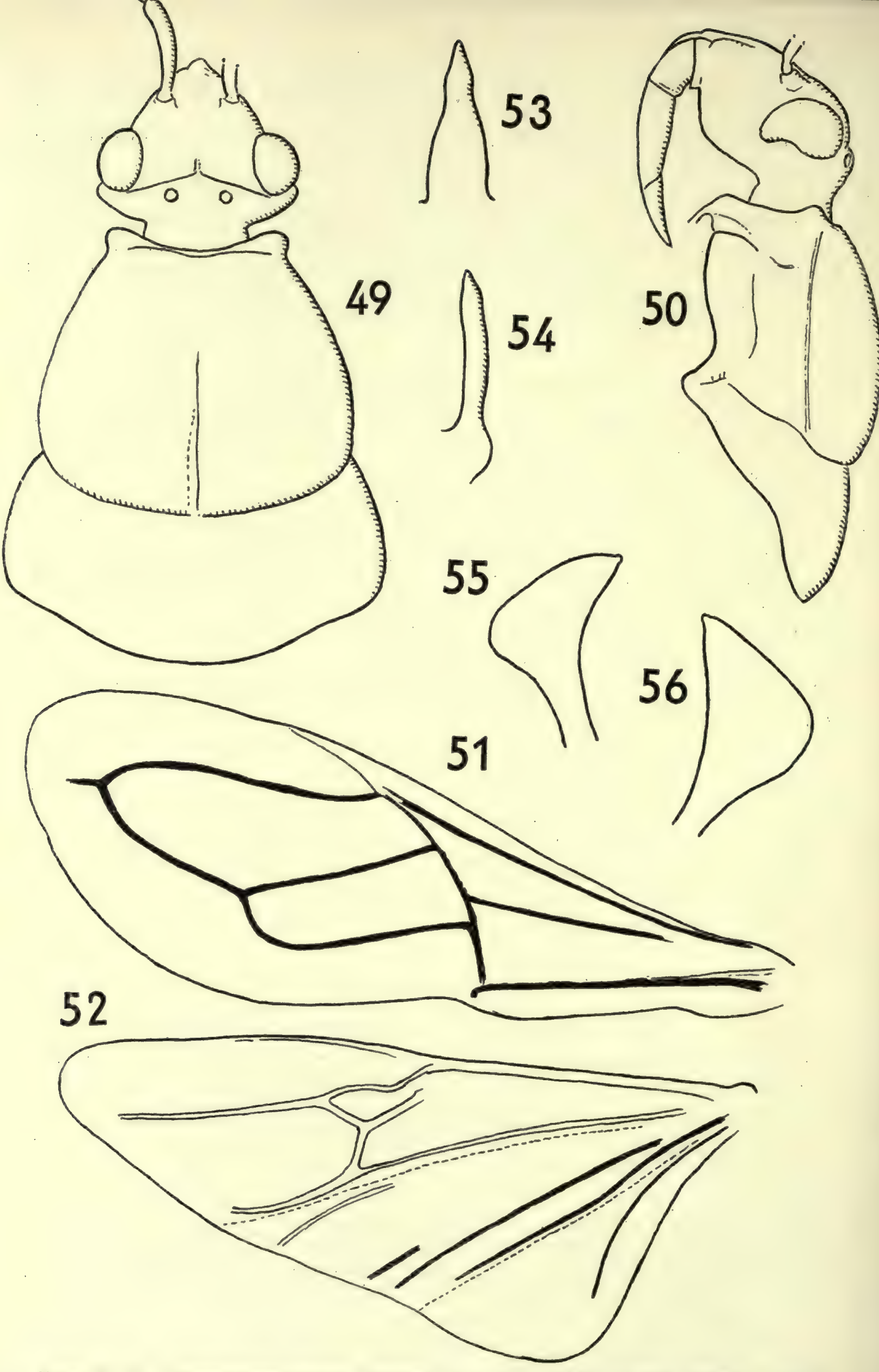
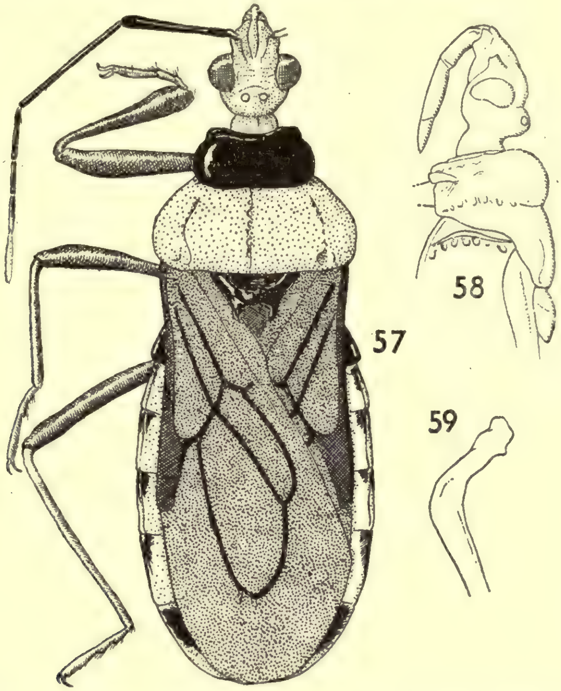
[1] **κολαστής** = a chastiser, **κορις** = a bug.



FIGS. 49–56. *Pteromalestes nyassae* (Distant), gen. nov. (49) Head and pronotum, dorsal view. (50) *Idem*, lateral view. (51) Hemelytron. (52) Metathoracic wing. (53) Apical process of pygophore. terminal view. (54) *Idem*, lateral view. (55) Right harpago. (56) Left harpago.

shallowly depressed. Hemelytra extending to apex of abdomen; costal area of corium only coriaceous. Abdomen with connexival segments 2–4 and mid-ventrally longitudinally sulcate; all segments intersegmentally carinulate. Anterior femora moderately incrassate; anterior tibiae moderately incrassate apically; anterior and median tibiae with a fossula spongiosa.

Type species, *Colastocoris laetus* sp. n. Text-figs. 57–59.



FIGS. 57–59. *Colastocoris laetus* gen. nov., sp. n. (57) Whole insect, dorsal view. (58) Head, pronotum, scutellum and mesopleuron, lateral view. (59) harpago.

Colastocoris laetus sp. n.

COLOUR. Segments 1–5 of antennae piceous; segment 5 apically, segment 6, pale yellow. Head and rostrum light brown. Anterior pronotal lobe, pleura, except propleural epimeron, meso- and metapleura and sterna, scutellum, piceous; posterior pronotal lobe, propleural epimeron, light red. Hemelytra fuscous; non-coriaceous areas of corium infumate. Abdomen dark yellow; connexival segment 2 black; other connexival segments with suffused piceous spot basally; ventrolaterally with suffusion, greater part of segment 7, pygophore, piceous. Legs brown; femora somewhat paler basally; posterior tibiae with a pale testaceous annulation basally.

STRUCTURE. Antennae with moderately long setae. Vertex about twice as wide as an eye; ocellar interspace a little wider than an ocellus. Median sulcus on anterior pronotal lobe feeble; disc of scutellum deeply excavate. Fossula spongiosa very short.

Total length, 8·60 mm.; hemelytra, 5·40 mm.; greatest pronotal width, 2·50 mm.

One ♂ (holotype), Solomon Islands, Bougainville, 10.vii.1922, E. A. Armytage (B.M. 1947–284), 1 ♂, Kieta, 9.x.1937, J. L. Froggatt (B.M. 1948–548), 1 ♂, Shortland Islands, Lofung, 25.x.1936, R. A. Lever.

Allied possibly to *Caloundranius* Miller, 1957, *Bull. Brit. Mus.* **5**, 2 : 65–66, from which it differs in the somewhat less robust habitus, relatively narrower head, less widely separated scutellar spines, relatively wider base of external membranal cell and in structure of sterna.

Subfamily APIOMERINAE

The subfamily Apiomerinae, established by Stål in 1859, contains, as constituted at present, fifteen genera, eleven of which are distributed in the Neotropical Region, one in the Nearctic Region and three in the Ethiopian Region. They appear to possess one characteristic in common, namely the faculty of utilizing exudations or resins from various trees to assist in the capture of prey. They smear the anterior tibiae with the resin in which small insects, if they come into contact with it, become entangled. It has not been fully established if this faculty is possessed by all genera.

Very little is known about the habitats of the Apiomerinae, but, apparently those inhabiting the Neotropical Region and Nearctic Region frequent mainly foliage and those found in the Ethiopian Region live among leaf-debris or under the bark of dead trees.

Morphologically some similarities exist. For example, representatives of the Neotropical genera have the apex of the anterior tibiae sulcate, the sulcus receiving the tarsus when not in use. The tarsus, in this case, is reduced in size. The median tibiae in some genera are also sulcate, but the tarsi are not noticeably reduced.

A striking feature in certain species of *Apiomerus* is the foliaceous expansion which arises from each side of the apical margin of the eighth abdominal segment in females.

In one of the Ethiopian genera (*Cleontes*), the anterior tarsi are absent. In the other genera (*Diaspidius*, *Rodhainiella*), they are reduced in size and when not in use, lie in a sulcus on the tibia.

There are, however, significant differences in morphology between the Neotropical and Ethiopian genera. They may be summarized as follows :

Neotropical genera	Ethiopian genera
Ocelli widely separated and feebly elevated ; directed more or less outwards .	Ocelli widely separated ; strongly elevated ; directed outwards.
Rostrum extending beyond anterior margin of prosternum .	Rostrum not extending beyond anterior margin of prosternum.
Stridulatory furrow present .	Stridulatory furrow absent.
Discal cell of corium relatively small .	Discal cell of corium relatively large.
Seventh abdominal segment in males normal .	Seventh abdominal segment in males strongly expanded.
Posterior pronotal lobe not produced posteriorly ; scutellum not concealed .	Posterior pronotal lobe strongly produced posteriorly ; scutellum concealed.
Head, body and legs usually strongly setose .	Head and legs only setose.

These differences, in my opinion, are such as to warrant the removal of the Ethiopian genera from the Apiomerinae. There is no other subfamily into which they can correctly be placed, therefore I propose a new subfamily, Diaspidiinae, for their reception.

DIASPIDIINAE, subfam. nov.

Macropterous. Head and legs setose. Rostrum thick, straight, extending to anterior margin of prosternum ; basal segment very short. Ocelli lateral, elevated. Anterior pronotal lobe much shorter than posterior lobe, the latter strongly produced posteriorly and concealing the scutellum. Connexivum expanded, simple or undulate. Discal cell of corium large. Legs moderately thick ; anterior tarsi reduced or absent ; when present rest in a sulcus at apex of tibia.

The three genera which the new subfamily contains may be separated by the following key :

1. Anterior tarsi absent . . . . *Cleontes* Stål, 1874
– Anterior tarsi present 2
2. Vertex twice as wide as an eye ; basal antennal segment shorter than head *Rodhainiella* Schout., 1913
– Vertex subequal in width to an eye ; basal antennal segment as long or longer than head . . . . *Diaspidius* Westw., 1857

Field observations on some of the genera have revealed instances of the use of a resin or some such exudation from trees. This substance is applied to the anterior tibiae for the purpose of catching other insects for food. This method is also employed by members of the Oriental subfamily Ectinoderiinae.

Subfamily RHAPHIDOSOMINAE

HARRISOCORIS gen. nov.

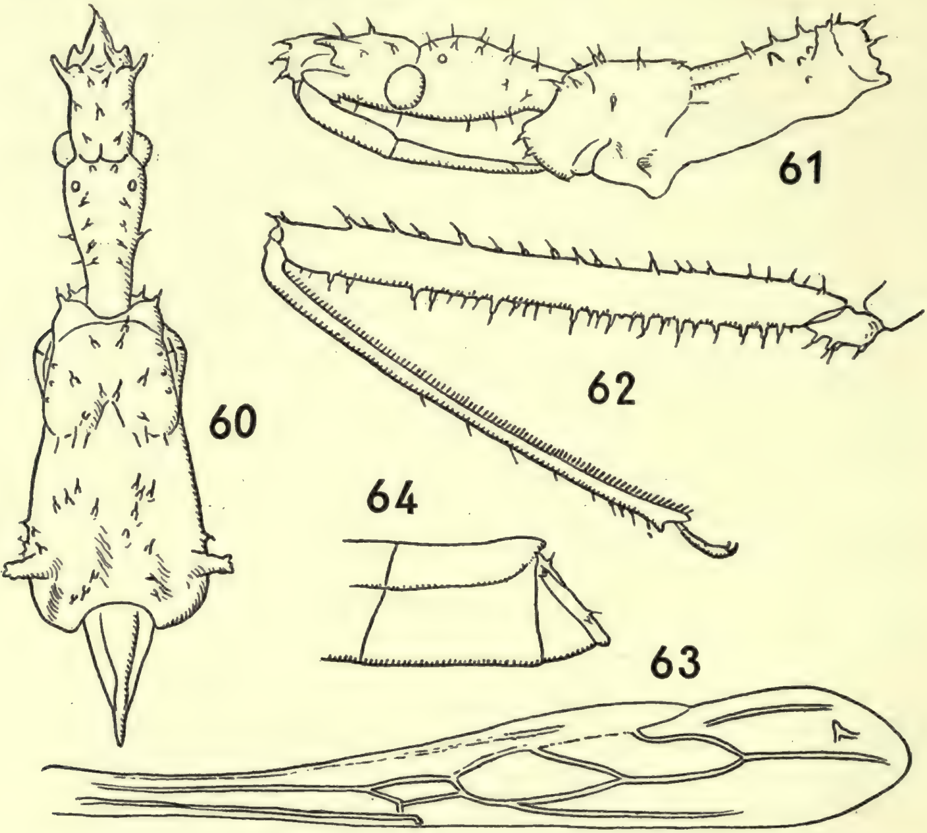
SIZE. Small. Elongate. Antennae missing. Head shorter than pronotum ; antennophores nearer to apex of head than to eyes and with a spine basally ; anteocular shorter than postocular, both with setigerous tubercles ; vertex wider than an eye ; ocelli small, lateral, widely separated ; basal segment of rostrum thicker than segment 2 and somewhat shorter, extending to middle of eyes. Pronotum longer than wide ; anterior lobe shorter than posterior lobe with a median, longitudinal sulcus basally ; transverse sulcus interrupted medially ; posterior lobe with indications of longitudinal carinae and with humeral angles tuberculate ; both lobes with setigerous tubercles ; posterior margin of posterior lobe deeply excised ; scutellum longer than wide with apex produced. Hemelytra not extending to apex of abdomen ; base of membranal cells subequal in width. Abdomen with sides parallel ; external apical angle of seventh connexival segment produced. Anterior femora moderately incrassate ; median and posterior femora, all tibiae slender, the former with apex somewhat incrassate ; femora with setigerous tubercles. Head, body, legs, corium with dense, minute flattened and spatulate setae.

Type species, *Harrisocoris africanus* sp. n. Text-figs. 60–64.

Harrisocoris africanus sp. n.

Colour. Light brown ; connexival segments with a suffused black spot apically. Setae pale fulvous ; setae on abdomen ventrally white.

Structure. Vertex three times as wide as an eye ; ocellar interspace equal in width to vertex. Produced apex of scutellum acute, horizontal. Seventh abdominal segment with tubercles near apical margin.



Figs. 60–64. *Harrisocoris africanus* gen. nov. sp. n. (60) Head pronotum and scutellum, dorsal view. (61) Head and pronotum lateral view. (62) Anterior leg. (63) Hemelytron. (64) Apex of abdomen lateral view.

Total length, 12·50 mm.; hemelytra, 7·20 mm.; greatest pronotal width, 1·50 mm. One ♀ (holotype), Tanganyika, Morogoro, 24.iv.1930, W. V. Harris (on cotton) (B.M. 1950–96).

Allied to *Lopodytes* Stål, 1853, *Öfv. Vet.-Ak. Förh.* **10**, p. 263, from which it differs in having the head relatively less elongate, the postocular more globose, the ante- and postocular with setigerous tubercles, the antennophores with a spine, the tylus with setigerous tubercles, the anterior pronotal lobe much shorter than the posterior lobe, both lobes with setigerous tubercles, the posterior lobe with humeral angles tuberculate, the posterior margin strongly excised, the cells of the membrane of approximately the same size and the femora with setigerous tubercles.

Subfamily HARPACTORINAE

THEREUTOCORIS gen. nov.[1]

SIZE. Moderate. Smooth. Antennae longer than head, body and hemelytra together. Antennophores equidistant between eyes and apex of head ; basal segment of rostrum shorter than segment 2, extending to anterior margin of eyes ; head longer than pronotum ; eyes prominent, shorter than height of head ; vertex subequal in width to an eye ; anteocular shorter than postocular ; ocelli small, widely separated. Anterior pronotal lobe shorter than posterior lobe with a median, longitudinal sulcus basally ; posterior lobe widely shallowly depressed medially ; posterolateral angles not produced. Scutellum longer than wide with apex produced ; disc feebly depressed. Hemelytra extending beyond apex of abdomen ; discal cell of corium longer than wide ; base of external cell of membrane narrower than base of internal cell. Abdomen feebly constricted basally. Legs slender ; femora feebly incrassate and constricted apically.

Type species, *Thereutocoris amoenus* sp. n. Text-figs. 65–68.

Thereutocoris amoenus sp. n.

COLOUR. Antennae black ; basal segment with 2, segment 2 with 1 wide, pale yellow annulations. Head black, except base pale reddish yellow. Thorax reddish yellow ; posterior pronotal lobe with a large black spot on humeral angles ; apex of scutellum white. Corium reddish yellow, broadly black basally, except extreme base ; apex suffused with piceous ; membrane dark violaceous infumate in basal half ; remainder pale yellow. Abdomen with segments 2–5 reddish and remainder black ; connexival segments 5–7 with a pale yellowish spot. Coxae, trochanters, femora reddish yellow ; femora with apex black, a wide subapical pale yellow annulation and a suffused blackish annulation medially ; tibiae and tarsi black, the former with 2 wide, pale yellow annulations.

STRUCTURE. Segment 2 of antennae a little less than half as long as basal segment ; segments 3 and 4 together somewhat longer than basal segment. Segments 2 and 3 of rostrum together about twice as long as basal segment. Sulcus on anterior pronotal lobe very narrow and within a very shallow depression. Produced portion of scutellum horizontal, rounded apically and with a semicircular sulcus subapically. Discal cell of corium about three times longer than wide.

Total length, ♂ 13·00 mm., ♀ 15·00 mm.; hemelytra, ♂ 10·00 mm., ♀ 11·50 mm.; greatest pronotal width, ♂ 2·80 mm., ♀ 3·00 mm.

One ♂ (holotype), Solomon Islands, Guadalcanal, Gold Ridge, 20.iii.1955, 1 ♀ (paratype), Guadalcanal, Tinakula River, 19.iii.1955, 1 ♀ (paratype), Guadalcanal,

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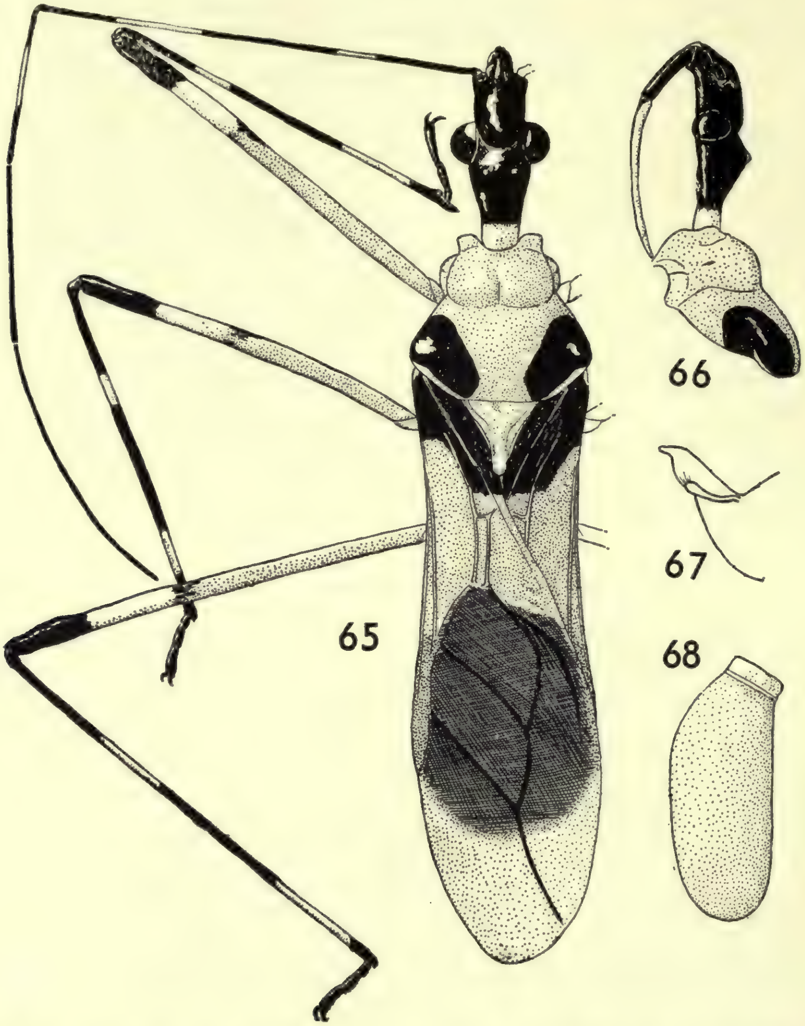
[1] θηρευτης = hunter, κορις = bug.

Sutakiki River, 23.vi.1956, E. S. Brown, 1 ♀, Guadalcanal, 5000 ft., xii.1934, C. Bird (*per* R. A. Lever), B.M. 1948–548).

Black humeral spots are absent from the ♀ from Tinakula River.



FIGS. 65–68. *Thereutocoris amoenus* gen. nov., sp. n. (65) Whole insect, dorsal view. (66) Head and pronotum, lateral view. (67) Apex of pygophore, lateral view. (68) Ovum.

Ovum. (Text-fig. 68). Cylindrical, feebly curved towards opercular end; differentiated portion of chorion moderately long; chorion smooth, shining, yellow; differentiated portion white, 2·00 mm. (dissected). This is a relatively large ovum.

Allied to *Euagoras* Burmeister, 1835, *Handbuch*, **2**, p. 226 (*pro parte*).

Differs in the relative lengths of the head and rostral segments, structure of the scutellum and venation of the hemelytra.

PROTENTHOCORIS gen. nov.[1]

Size. Small. Basal antennal segment longer than head, pronotum and scutellum together ; segment 2 a little more than half as long as basal segment ; segment 3 half as long as basal segment ; segment 4 two-thirds as long as 3. Head shorter than pronotum ; antennophores projecting beyond apex of head with a spine at base ; anteocular shorter than postocular, more or less vertical apically ; postocular tuberculate laterally ; juga produced anteriorly ; ocelli widely separated ; vertex wider than an eye ; basal segment of rostrum moderately thick, as long as remaining segments together, extending beyond posterior margins of eyes. Pronotum as long as wide ; anterior lobe shorter than posterior lobe with tubercles laterally and on collar laterally ; lateral angles of collar not produced. Scutellum longer than wide ; disc not excavate or foveolate ; prosternum medially produced. Hemelytra extending beyond apex of abdomen ; base of external cell of membrane wider than base of internal cell. Anterior femora moderately incrassate ; anterior tibiae, median and posterior legs slender. Pleura with area with dense, tomentose pubescence.

Type species, *Protenthocoris sedulus* sp. n. Text-figs. 69–73.

Protenthocoris sedulus sp. n.

Colour. Antennae and legs pale stramineous ; basal antennal segment with feeble reddish suffusion basally. Head and pronotum, scutellum, upper area of propleura testaceous. Rostrum, gula, remainder of propleura, meso- and metapleura pale stramineous. Corium subhyaline, almost colourless with faint reddish suffusion apically ; clavus, area between claval suture and *Cu*, membrane hyaline, almost colourless. Abdomen dorsally yellow ; connexival segments 4–6 with a large blackish spot basally ; abdomen ventrally whitish.

Structure. Ocellar interspace twice as wide as space between an ocellus and an eye. Tubercles on postocular, lateral angles of collar, and on anterior pronotal lobe laterally very short, rounded. Anterior pronotal lobe smooth ; posterior lobe rugose punctate ; humeral angles obtusely conical ; produced part of prosternum very short, conical.

Total length, ♂ 10·00 mm., ♀ 11·50 mm.; hemelytra, ♂ 7·00 mm., ♀ 8·00 mm.; greatest pronotal width, ♂ 2·00 mm., ♀ 2·50 mm.

One ♂ (holotype), Uganda, Entebbe, 17.viii.1938, H. Hargreaves, 1 ♂, 2 ♀ (paratypes), Kisumu, April, 1936, H. J. A. Turner.

The specimens from Kisumu differ in having a short spine on the humeral angles ; apart from this there appear to be no other characters which would justify their being considered another species. They differ in colour in that the connexivum is devoid of spots.

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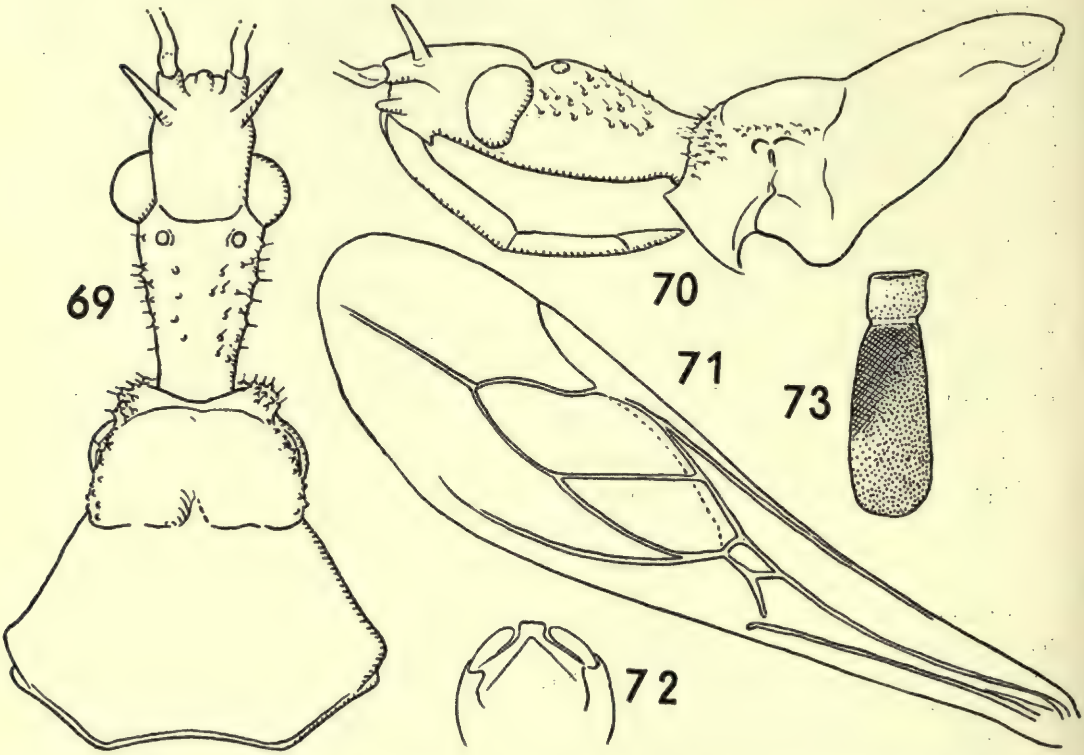
[1] *προτενθης* = a gourmand, *κορις* = a bug.

Ovum (text-fig. 73). Cylindrical with a relatively long differentiated portion of the chorion; partly smooth, partly reticulate; operculum with abundant short, erect, slender processes. Brownish yellow; differentiated portion of chorion white, 1·60 mm. (dissected).



Figs. 69–73. *Protenthocoris sedulus* gen. nov., sp. n. (69) Head and pronotum, dorsal view. (70) *Idem*, lateral view. (71) Hemelytron. (72) Pygophore, dorsal view. (73) Ovum.

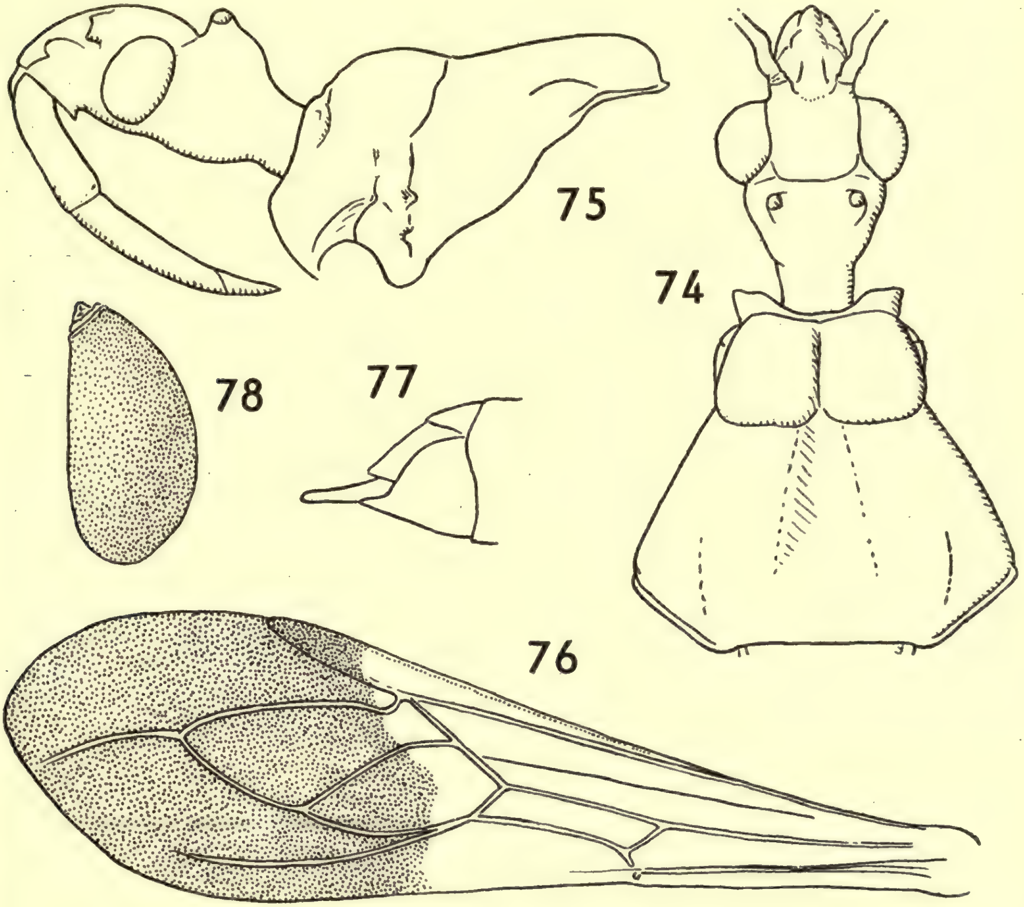
Apparently should be placed near *Nagusta* Stål, 1859, *Öfv. Vet.-Ak. Förh.* **16**, p. 374.

NANYUKICORIS gen. nov.

Size. Moderate. Smooth. Basal antennal segment longer than head; shorter than head and pronotum together; segment 2 much shorter than basal segment; segment 3 longer than 2; segment 4 missing. Head shorter than pronotum; anteocular shorter than postocular, the latter somewhat abruptly narrowed to base; vertex wider than an eye; ocelli widely separated, elevated; basal segment of rostrum moderately thick, extending to middle of eyes, shorter than segment 2.

Pronotum wider than long ; anterior lobe shorter than posterior lobe, medially longitudinally sulcate and with lateral angles of collar produced ; posterior lobe with a median, longitudinal depression, concurrent with sulcus on anterior lobe ; humeral angles marginally, dorsoventrally compressed ; posterolateral angles very feebly produced. Scutellum as long as wide with apex produced and disc foveolate. Hemelytra extending beyond apex of abdomen ; discal cell of corium longer than wide ; base of membranal cells subequal in width. Abdomen somewhat constricted basally ; gonapophyses of eighth abdominal segment produced. Anterior and median femora nodulose.

Type species, *Nanyukicoris elegans* sp. n. Text-figs. 74–78.



Figs. 74–78. *Nanyukicoris elegans* gen. nov. sp. n. (74) Head and pronotum, dorsal view. (75) *Idem*, lateral view. (76) Hemelytron (lower scale of magnification). (77) Apex of abdomen, lateral view. (78) Ovum.

Nanyukicoris elegans sp. n.

Colour. Antennae black. Anteocular black; gula and postocular yellow, the latter with black area laterally; rostrum yellow; basal segment basally black. Pronotum black, except collar, humeral and posterolateral angles and posterior margin yellow; pleura yellow with greater part of propleura black; mesopleura with a black spot. Corium yellow with apex black; clavus, area between claval suture and *Cu*, discal cell, hyaline yellow; membrane infumate with base of cells yellow; metathoracic wings hyaline, pale yellow with apical half infumate. Abdomen yellow with genital segments black. Coxae, trochanters, femora yellow; posterior femora with 2 piceous annulations; anterior and median tibiae piceous with base broadly yellow; posterior tibiae black, narrowly yellow basally; tarsi piceous.

Structure. Segment 2 of antennae one-fifth as long as basal segment; segment 3 about twice as long as 2. Vertex nearly twice as wide as an eye. Ocellar interspace twice as wide as space between an ocellus and an eye. Discal foveole on scutellum deep. Discal cell of corium about one-third as wide as long.

Total length, 12·00 mm.; hemelytra, 10·00 mm.; greatest pronotal width, 3·00 mm.

One ♀ (holotype), Kenya, Nanyuki, v.1948, van Someren.

Ovum (text-fig. 78). Ampulliform, strongly narrowed towards opercular end; smooth; minutely reticulate; differentiated portion of chorion very short; operculum with an irregular conical elevation. Pale stramineous; differentiated portion of chorion white, 1·50 mm. (dissected).

Belongs to the *Harpagocoris-Callilestes* group. Differs from *Harpagocoris* Stål, 1855, *Öfv. Vet.-Ak. Förh.* **12**, p. 262, in the shape of the head, the postocular being relatively wider and shorter, in having the basal rostral segment relatively shorter, the posterior pronotal lobe medially sulcate, the base of the membranal cells subequal in width. It differs similarly from *Callilestes* Stål, 1866, *Öfv. Vet.-Ak. Förh,* **13**, p. 285, and also has the apex of the scutellum non-lamellate.

Irantha doreyana Distant, 1903, *Ann. Mag. nat. Hist.* **11**, p. 366

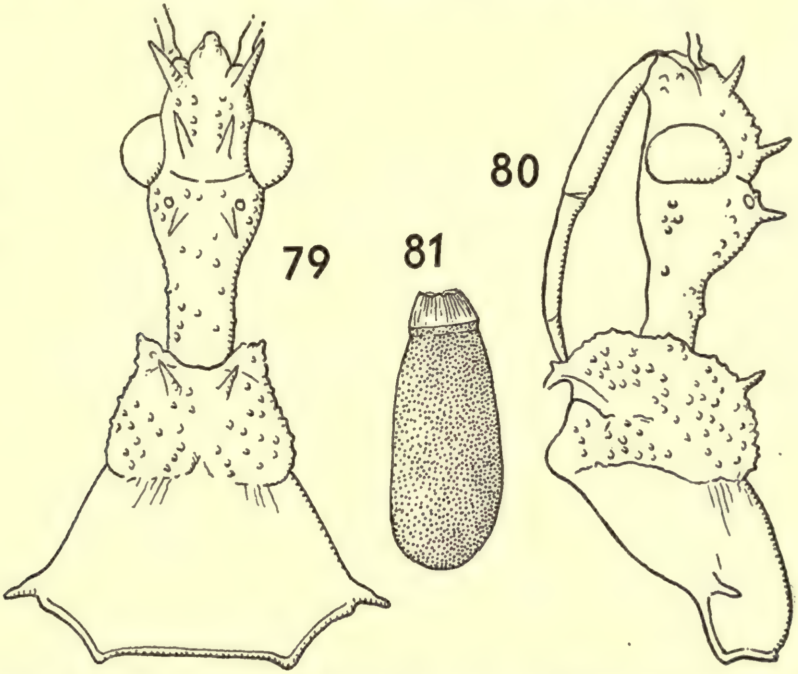
This species should not have been placed in *Irantha*. It cannot be properly assigned elsewhere, therefore I establish the following new genus to receive it:

PARIRANTHA gen. nov.

Size. Small. Antennae longer than head, pronotum and scutellum together. Head subequal in length to pronotum; vertex wider than an eye; ocelli widely separated; antennophores nearer to apex of head than to eyes; anteocular shorter than postocular, the latter globose then strongly constricted to base; both with tubercles and spines; basal segment of rostrum subequal in length to remaining segments together. Anterior pronotal lobe shorter than posterior lobe, the former with spines and tubercles, the latter rugose punctate; humeral angles produced; posterolateral and posterior margins of posterior lobe thickened. Scutellum triangular, as wide as long; apex not produced. Hemelytra extending to apex of abdomen;

discal cell longer than wide ; base of internal cell of membrane equal in width to base of external cell. Anterior femora incrassate, nodulose and spinose ; median and posterior femora feebly incrassate subapically ; anterior femora moderately thick, feebly curved. Abdomen somewhat constricted basally.

Type species, *Parirantha doreyana* (Distant). Text-figs. 79–80.



FIGS. 79–81. *Parirantha doreyana* (Distant), gen. nov. (79) Head and pronotum, dorsal view. (80) *Idem*, lateral view. *Iranthoides belua* (Miller), gen. nov. (81) Ovum.

Parirantha doreyana (Distant)

COLOUR. Pale testaceous (? spirit material).

STRUCTURE. Spines on vertex and postocular erect, a little longer than spines on antennophores which are feebly curved and directed forwards ; vertex twice as wide as an eye ; ocellar interspace about twice as wide as space between an ocellus and an eye.

Total length, 11·30 mm.; hemelytra, 6·60 mm.; greatest pronotal width, 2·50 mm.

One ♀ (holotype), Dorey, Wallace (B.M. 65–13).

Differs from *Irantha* Stål, 1861, *Stett. ent. Zeit.* **22**, p. 137 in the shape of the head which is relatively thicker, in the armature of the head and anterior femora and in the absence of tubercles on the connexivum and short spines on the tibiae.

Irantha belua Miller, 1941, *Journ. F.M.S. Mus.* **18**, pp. 368–370

This species was incorrectly placed in *Irantha* (loc. cit.). Since it cannot be placed correctly in any other known genus, I propose the new genus *Iranthoides* for it.

IRANTHOIDES gen. nov.

SIZE. Small. Basal antennal segment shorter than head ; segment 2 less than half as long as basal segment. Head subequal in length to pronotum ; anteocular shorter than postocular, the latter globose then strongly constricted ; antennophores equidistant between eyes and apex of head ; ante- and postocular tuberculate and with erect spines on upper surface ; constricted part of postocular with few tubercles ; ocelli widely separated ; basal segment of rostrum subequal in length to segment 2. Pronotum about as wide as long ; anterior lobe shorter than posterior lobe, the former tuberculate, the latter rugose punctate ; humeral angles produced. Scutellum longer than wide, apex produced, spatulate, oblique. Hemelytra extending beyond apex of abdomen. Base of abdomen constricted ; external margin of connexivum tuberculate. Anterior femora incrassate, tuberculate and spinose ; anterior tibiae feebly curved ; median and posterior legs slender, the femora feebly incrassate apically.

The ovum (text-fig. 81) (dissected), of *Iranthoides belua* is cylindrical, narrowly constricted at opercular end. Chorion smooth ; differentiated portion of chorion formed of fine fused filaments. Chorion brown ; differentiated portion whitish, 1·60 mm.

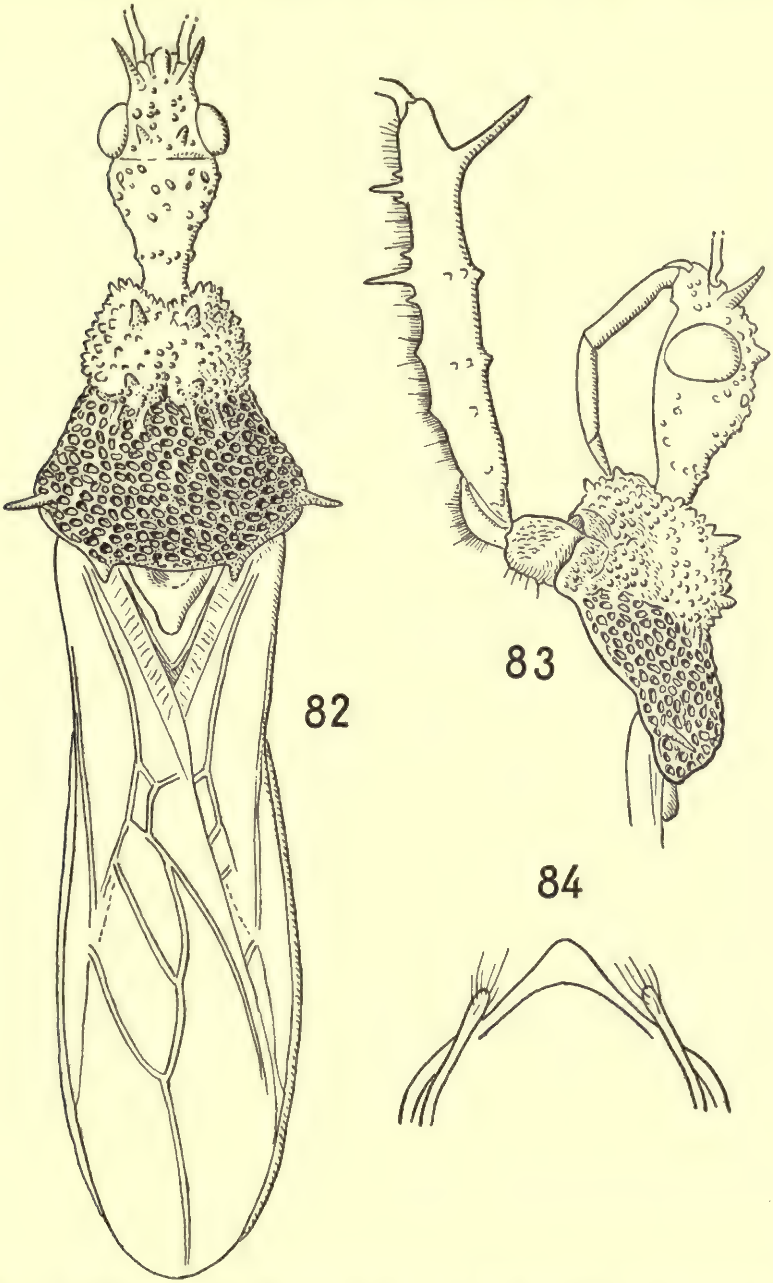
BUBIACORIS gen. nov.

SIZE. Small. Basal antennal segment longer than head ; segment 2 less than half as long as basal segment ; segment 3 one-third longer than 2 ; segment 4 twice as long as 2 ; antennophores equidistant between eyes and apex of head with a spine basally ; anteocular shorter than postocular ; vertex wider than an eye, tuberculate ; ocelli widely separated, directed laterally ; postocular globose then narrowed to a distinct neck, both tuberculate ; basal rostral segment subequal in length to remaining segments together. Anterior pronotal lobe subequal in length to posterior lobe, tuberculate and with a median longitudinal sulcus basally ; posterior lobe reticulately rugose and with short carinae anteriorly ; humeral angles with a spine ; postero-lateral angles produced ; scutellum triangular, as wide as long, disc excavate and with apex truncate. Hemelytra extending to apex of abdomen ; base of inner cell of membrane narrower than base of external cell. Abdomen somewhat constricted basally. Anterior femora nodulose with 1 long spine on upper surface and several much shorter spines on lower surface subapically ; median and posterior femora feebly nodulose. Pleura with short, tomentose pubescence.

Type species, *Bubiacoris bicolor* sp. n. Text-figs. 82–84.

Bubiacoris bicolor sp. n.

COLOUR. Basal segment of antennae piceous with 2 suffused brown annulations ; segment 2 piceous ; segments 3 and 4 brown. Head and thorax brown ; head and pronotum dorsally, scutellum black ; humeral angles and spines brown. Rostrum brown suffused with piceous. Abdomen pale stramineous. Corium piceous ; membrane infumate. Anterior legs piceous ; median and posterior coxae pale stramineous;



Figs. 82–84. *Bubiacoris bicolor* gen. nov., sp. n. (82) Whole insect, dorsal view (antennae and legs omitted). (83) Head, pronotum, anterior coxa, trochanter and femur, lateral view. (84) Apex of pygophore, dorsal view.

median and posterior femora and tibiae light brown, the former with dark brown suffusion apically; tarsi piceous. Pubescence on pleura white.

STRUCTURE. Basal antennal segment equal in length to head and anterior pronotal lobe together. Vertex with 2 moderately long conical tubercles and numerous low, rounded tubercles; postocular with low, rounded tubercles, those on neck arranged annularly; ocellar interspace almost as wide as vertex. Anterior pronotal lobe with 2 moderately long, subacute tubercles anteriorly, 2 shorter tubercles sub-basally; other tubercles mostly very short, conical or rounded.

Total length, 11·00 mm.; hemelytra, 6·50 mm.; greatest pronotal width, 2·00 mm. (excluding spines).

One ♂ (holotype), New Guinea, Lae, Bubia, 22.xi.1956, E. S. Brown.

Allied to *Irantha* Stål, 1861, *Stett. ent. Zeit.* **22**, p. 137. Differs in having the head shorter in relation to pronotum, the postocular with the constricted portion about as long as the globose portion, the anterior pronotal lobe tuberculate, the posterior margin of the posterior pronotal lobe lacking setigerous tubercles, the base of the external cell of the membrane wider than the base of the internal cell, the anterior femora smooth and not minutely granulose and the anterior tibiae lacking minute spines on the lower surface.

NOTHOCLEPTES gen. nov.[1]

SIZE. Small. Antennae relatively thick; basal segment longer than head and constricted in basal fourth; segments 2 and 3 together and segment 4 longer than basal segment. Head shorter than pronotum; antennophores nearer to eyes than to apex of head; anteocular shorter than postocular, the latter with a distinct neck; ocelli relatively large, widely separated, somewhat elevated; vertex wider than an eye; transverse sulcus almost straight, situated behind eyes; basal segment of rostrum subequal in length to segment 2. Anterior pronotal lobe smooth, shorter than posterior lobe, medially longitudinally sulcate for two-thirds basally and with a feeble median, transverse sulcus; posterior lobe rugulose, except humeral angles smooth; posterior margin very feebly concave; prosternum not transversely striate. Scutellum with a Y-shaped carina; disc depressed. Hemelytra extending just beyond apex of abdomen; corium with abundant setae; discal cell of corium longer than wide; base of external cell of membrane narrower than base of internal cell. Anterior tibiae thick; median and posterior tibiae slender; all tibiae abundantly setose; anterior femora feebly curved, somewhat incrassate towards apex; tuberculate; median and posterior femora without tubercles; all femora with sparse setae.

Type species, *Nothocleptes collaris* sp. n. Text-figs. 85–88.

Nothocleptes collaris sp. n.

COLOUR. Antennae, head and rostrum piceous. Pronotum yellow; collar, anterior lobe laterally, propleural episternum, meso- and metapleural piceous;

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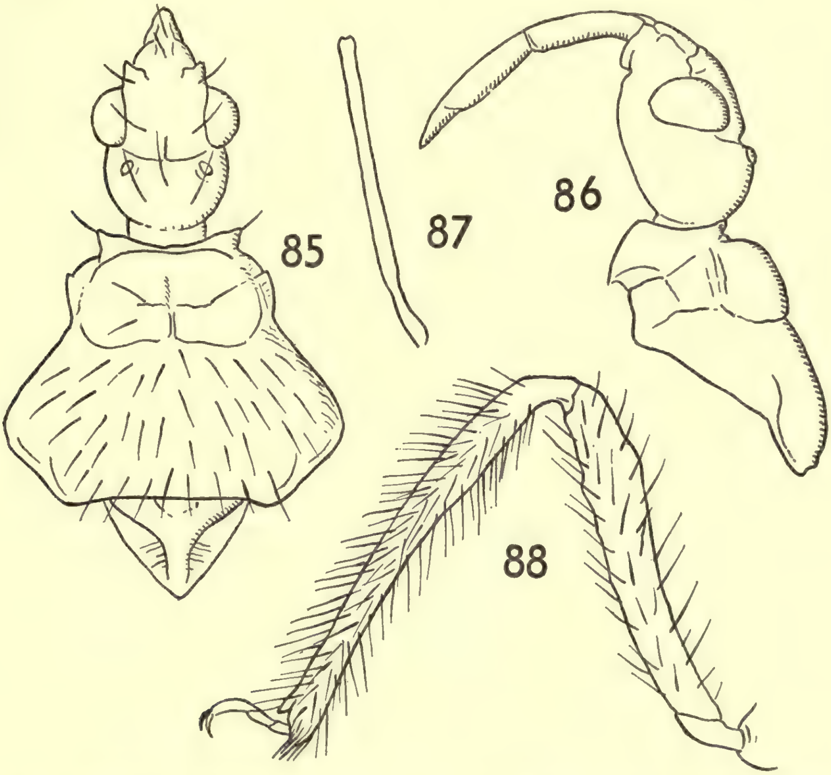
[1] *νόθος* = a bastard, *κλεπτες* = a thief.

scutellum, corium and abdomen yellow; hemelytral membrane hyaline faintly infumate. Coxae dark yellow; trochanters, femora and tibiae piceous.

STRUCTURE. Vertex with a short, narrow, median, longitudinal sulcus basally; ocellar interspace a little less wide than vertex; ocelli directed outwards and forwards feebly. Disc of scutellum very feebly depressed. Base of external cell of hemelytral membrane half as wide as base of internal cell. Setae on legs mostly long, on corium short. Tubercles on femora minute.



FIGS. 84–88. *Nothocoris collaris* gen. nov., sp. n. (85) Head, pronotum and scutellum, dorsal view. (86) Head and pronotum, lateral view. (87) Basal antennal segment. (88) Anterior leg.

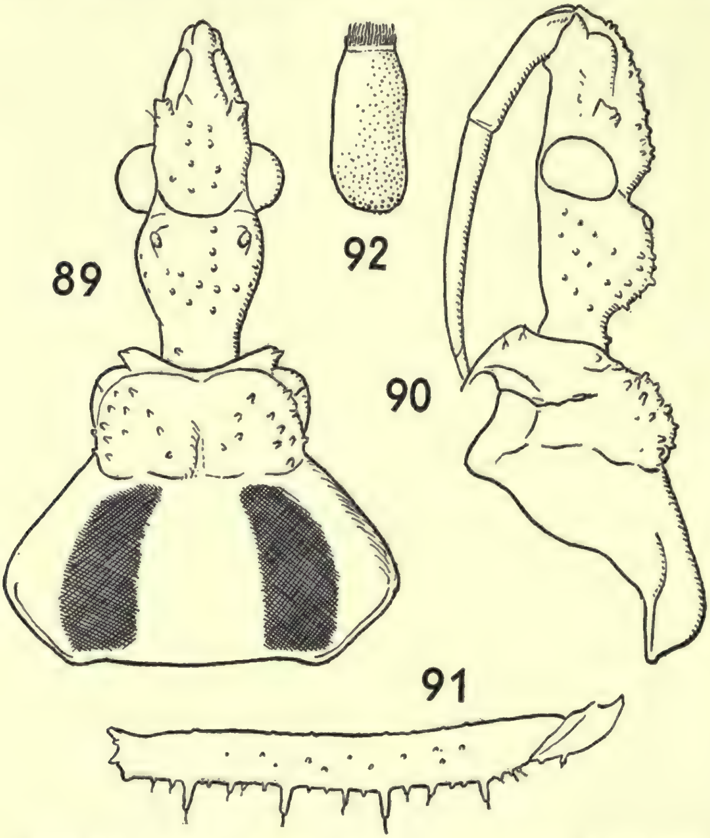
Total length, 7·00 mm.; hemelytra, 4·40 mm.; greatest pronotal width, 1·90 mm. One ♀ (holotype), Kenya, Nairobi, ix.1934, van Someren.

Allied to *Sphedanolestes* Stål, 1866, *Öfv. Vet.-Ak. Förh.*, pp. 284, 288. Differs in having the head considerably shorter than pronotum, width of eyes less than half that of vertex, antennophores nearer to eyes than to apex of head, the basal rostral segment subequal in length to segment 2, legs not very long and femora not nodulose but feebly tuberculate, and also in having the prosternal furrow non-striate and the basal antennal segment widely constricted basally.

Moto biplagiatus sp. n.

(Text-figs. 89–92)

COLOUR. Antennal segments 1 and 2 piceous; segment 3 yellow, narrowly piceous basally; segment 4 missing. Head, body and legs pale yellow; legs and rostrum paler; tylus, suffusion behind ocelli, brown; postocular reddish. Anterior pronotal lobe dark yellow; posterior lobe with 2 large, sublunate brown spots; propleural episternum, meso- and metapleura with reddish brown suffusion. Scutellar disc dark yellow. Corium suffused with infumate except basally; membrane faintly infumate. Connexival segments 5–7 with a narrow, marginal piceous spot.



FIGS. 89–92. *Moto biplagiatus* sp. n. (89) Head and pronotum, dorsal view. (90) *Idem*, lateral view. (91) Anterior femur. (92) Ovum.

Allied to *Moto rhodesianus* Miller, 1950, *Proc. zool. Soc. Lond.* 120, p. 257, but differs in less robust habitus, coloration, less strongly tuberculate head and anterior pronotal lobe, the tubercles being also relatively smaller and in the armature of the anterior femora.

Total length, 8·50 mm.; hemelytra, 5·50 mm.; greatest pronotal width, 2·00 mm.

One ♀ (holotype), 1 ♀ (paratype), Tanganyika, Kinde, Uluguru Mts., Dec. 1930, W. V. Harris (B.M. 1950–96).

Ovum (text-fig. 92). Cylindrical, somewhat obliquely rounded truncate basally; narrower at opercular end; apical margin of chorion with short, closely placed filaments; operculum with longer, coarser filaments; chorion smooth, except base minutely granulose. Chorion yellow; chorionic and opercular filaments white, 1·20 mm.

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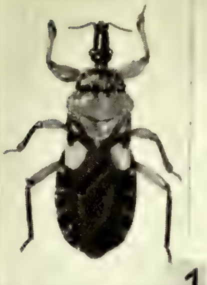
NATURAL HISTORY

PLATE 1

Fig. 1. *Tiarodes waterstradti* Breddin, 21·00 mm.
Fig. 2. *T. acutangulus* sp. n., 18·50 mm.
Fig. 3. *T. nemoralis* sp. n., 19·00 mm.
Fig. 4. *T. erinnys* Miller, 27·00 mm.
Fig. 5. *T. hieroglyphicus* Miller, 27·00 mm.
Fig. 6. *T. jucundus* sp. n., 31·00 mm.
Fig. 7. *T. juncturus* Walker, 32·00 mm.
Fig. 8. *T. nobilis* sp. n., 29·00 mm.
Fig. 9. *T. nigrirostris* Stål, 32·00 mm.
Fig. 10. *T. lotus* sp. n., 21·50 mm.
Fig. 11. *T. opulentus* sp. n., 25·00 mm.
Fig. 12. *T. pustulatus* Stål, 27·00 mm.
Fig. 13. *T. sakai* Miller, 20·50 mm.
Fig. 14. *T. ostentans* sp. n., 28·00 mm.
Fig. 15. *T. scriptus* sp. n., 27·00 mm.
Fig. 16. *T. sulaensis* sp. n., 31·50 mm.
Fig. 17. *T. xantusi* Reuter, 29·00 mm.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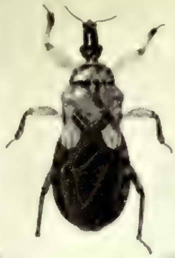
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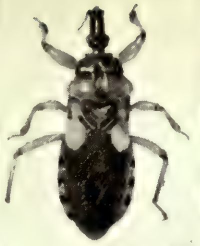
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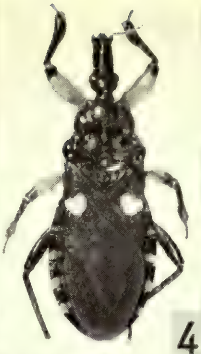
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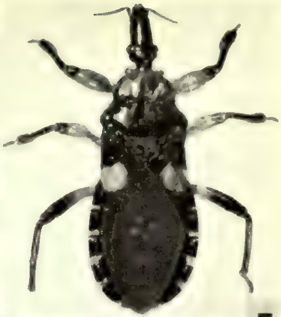
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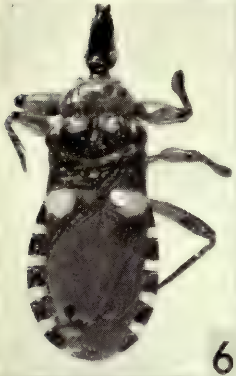
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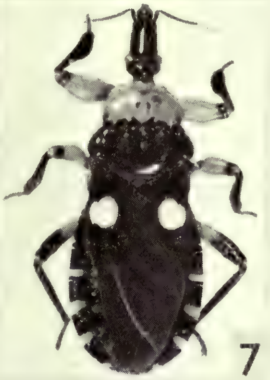
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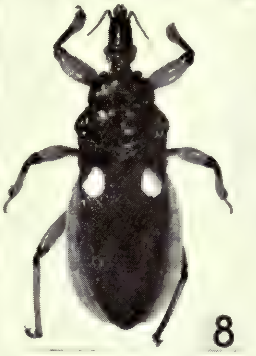
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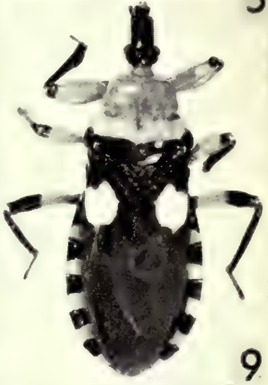
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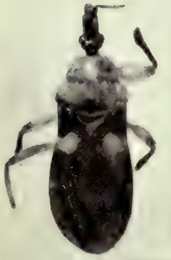
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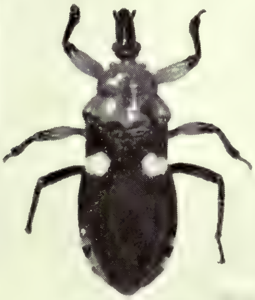
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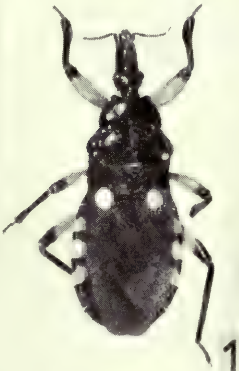
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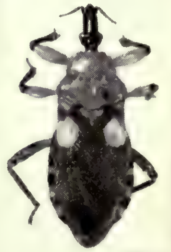
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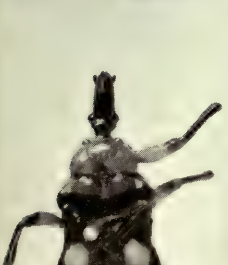
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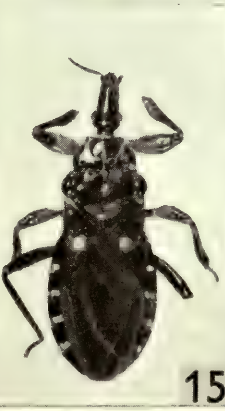
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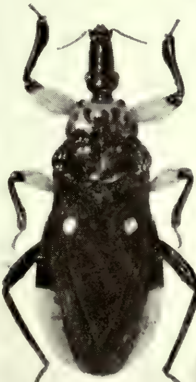
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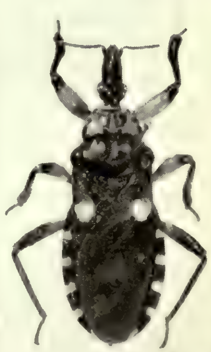
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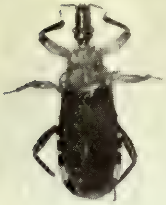
PLATE 2

Fig. 1. *Tiarodes selangorensis* Miller, 16·00 mm.
Fig. 2. *T. excellens* sp. n., 16·50 mm.
Fig. 3. *T. hageni* sp. n., 14·50 mm.
Fig. 4. *T. assamensis* sp. n. 15·00 mm.
Fig. 5. *T. vorax* Miller, 15·50 mm.
Fig. 6. *T. obyanus* Distant, 12·00 mm.
Fig. 7. *T. taipingensis* Miller, 17·00 mm.
Fig. 8. *T. mjöbergi* sp. n., 16·00 mm.
Fig. 9. *T. veneficus* Miller, 15·50 mm.
Fig. 10. *T. dohertyi* Miller, 12·00 mm.
Fig. 11. *T. picturatus* Distant, 10·00 mm.
Fig. 12. *T. dubius* Reuter, 14·00 mm.
Fig. 13. *T. propinquus* sp. n., 16·00 mm.
Fig. 14. *T. convivus* Miller, 17·00 mm.
Fig. 15. *T. similis* sp. n., 14·50 mm.
Fig. 16. *T. ambulator* sp. n., 14·00 mm.
Fig. 17. *T. browni* sp.n., 11·50 mm.
Fig. 18. *T. bradleyi* sp. n., 11·00 mm.
Fig. 19. *T. serenus* Miller, 12·50 mm.
Fig. 20. *T. gracilis* sp. n., 14·00 mm.
Fig. 21. *T. rabiosus* Miller, 16·00 mm.
Fig. 22. *T. schultzei* sp. n., 14·00 mm.
Fig. 23. *T. cameronicus* sp. n., 15·50 mm.
Fig. 24. *T. varipennis* sp. n., 13·50 mm.
Fig. 25. *T. elegans* Stål, 14·00 mm.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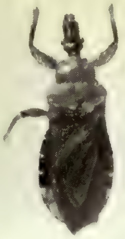
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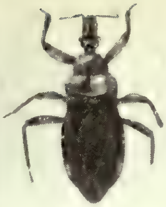
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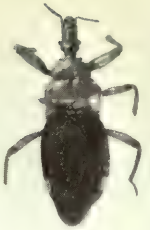
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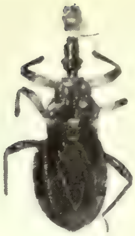
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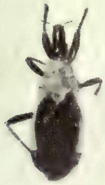
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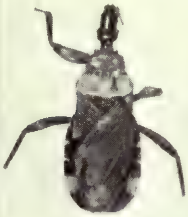
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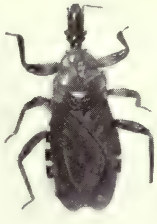
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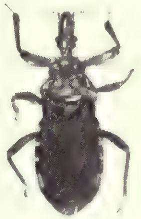
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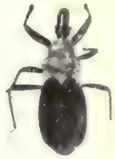
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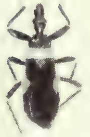
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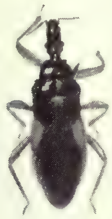
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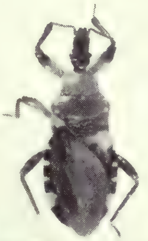
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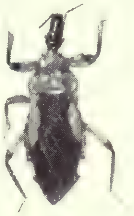
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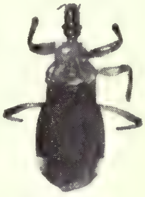
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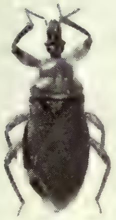
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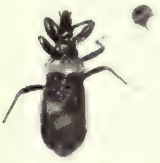
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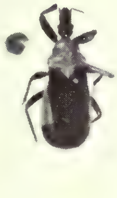
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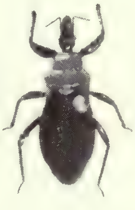
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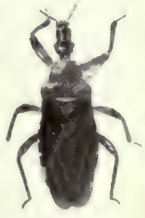
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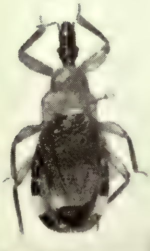
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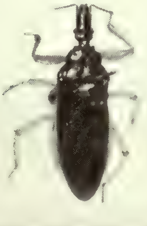
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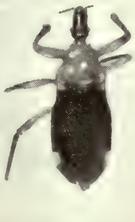
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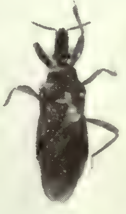
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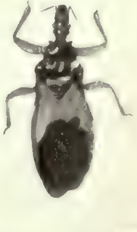
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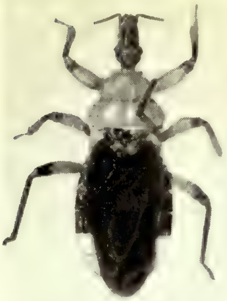
PLATE 3

Fig. 1. *Tiarodes dux* sp. n., 18·00 mm.
Fig. 2. *T. salvazai* sp. n. 16·00 mm.
Fig. 3. *T. frühstorferi* Breddin, 18·00 mm.
Fig. 4. *T. flavicans* sp. n., 16·50 mm.
Fig. 5. *T. nebulosus* sp. n., 15·00 mm.
Fig. 6. *T. miles* sp. n., 16·00 mm.
Fig. 7. *T. nitidus* Miller, 16.00 mm.
Fig. 8. *T. servus* sp. n., 17·00 mm.
Fig. 9. *T. celebensis* sp. n., 18·00 mm.
Fig. 10. *T. timorensis* sp. n., 19·00 mm.
Fig. 11. *T. obscuripes* sp. n., 15·00 mm.
Fig. 12. *T. varicolor* Stål, 19·00 mm.
Fig. 13. *T. helluo* sp. n., 17·00 mm.
Fig. 14. *T. insulanus* sp. n., 20·00 mm.
Fig. 15. *T. meldolae* Distant, 19·00 mm.
Fig. 16. *T. vilis* sp. n., 16·00 mm.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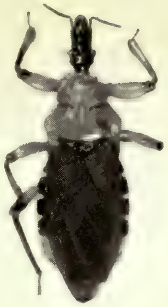
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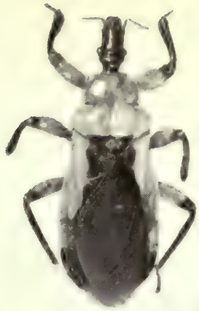
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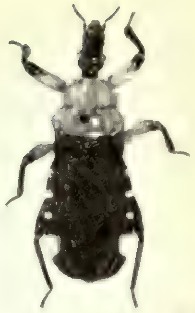
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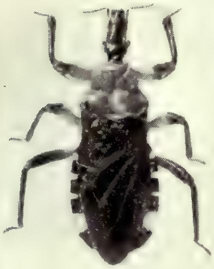
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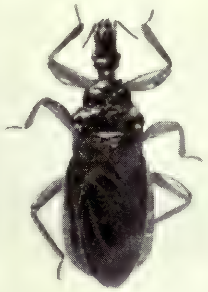
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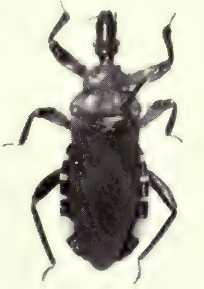
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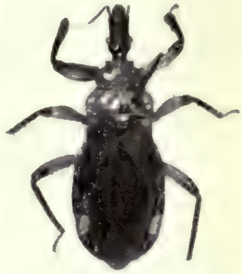
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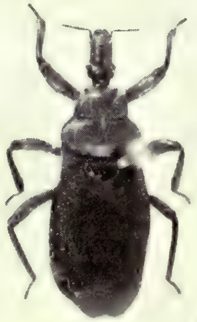
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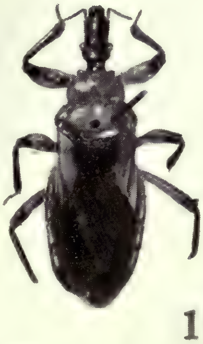
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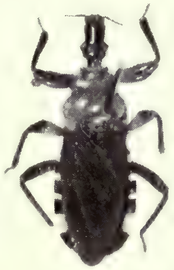
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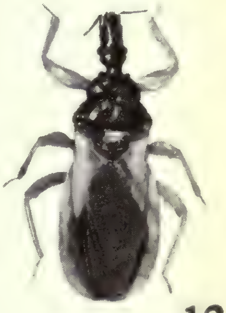
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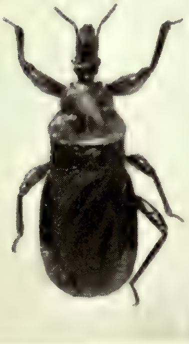
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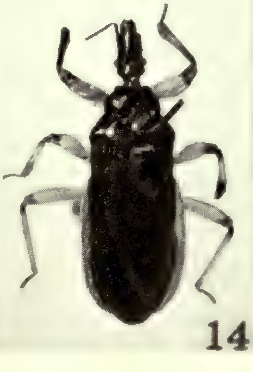
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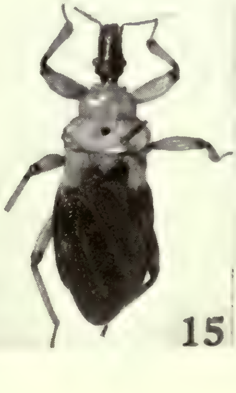
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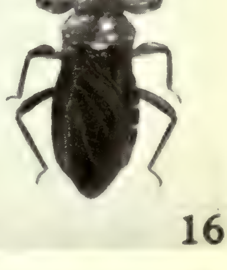
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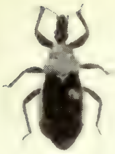
PLATE 4

Fig. 1. *Tiarodes biroi* sp. n., 10·50 mm.
Fig. 2. *T*., *vexillarius* sp. n., 16·00 mm.
Fig. 3. *T. dyak* sp. n., 14·50 mm.
Fig. 4. *T. hilaris* sp. n., 15·00 mm.
Fig. 5. *T. attrahens* sp. n., 18·00 mm.
Fig. 6. *T. mouhoti* sp. n., 17·00 mm.
Fig. 7. *T. versicolor* (Laporte), 16·00 mm.
Fig. 8. *T. ovatulus* Miller, 18·00 mm.
Fig. 9. *T. bukit* Miller, 22·00 mm.
Fig. 10. *T. rufithorax* Reuter, 25·00 mm.
Fig. 11. *T. mirandus* Miller, 23·00 mm.
Fig. 12. *T. obscuripennis* sp. n., 15·00 mm.
Fig. 13. *T. elongatus* Miller, 21·00 mm.
Fig. 14. *T. brunneiventris* sp. n., 20·00 mm.
Fig. 15. *T. cruentus* Stål, 15·00 mm.
Fig. 16. *T. luzonicus* sp. n., 15·50 mm.
Fig. 17. *T. amoenus* Miller, 18·00 mm.
Fig. 18. *T. sumatrensis* sp. n., 20·50 mm.
Fig. 19. *T. malayanus* Distant, 22·00 mm.
Fig. 20. *T. simplex* sp. n., 21·00 mm.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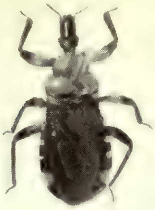
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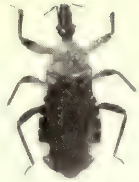
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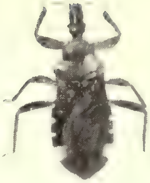
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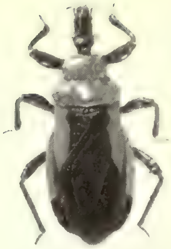
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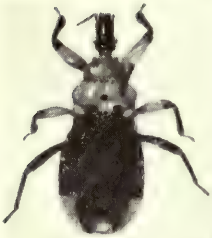
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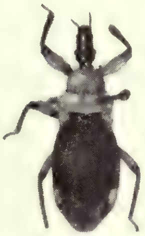
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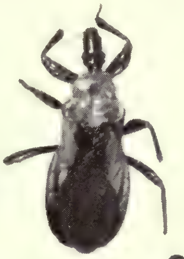
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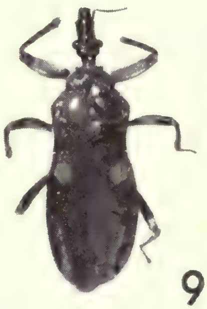
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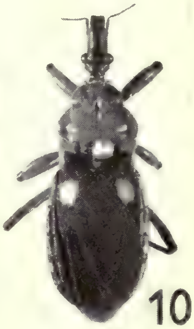
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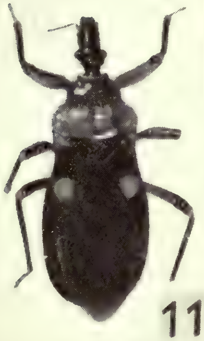
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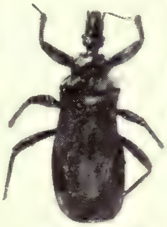
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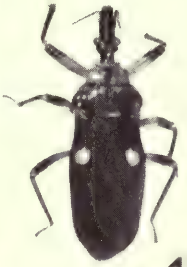
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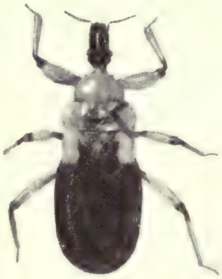
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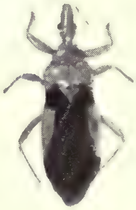
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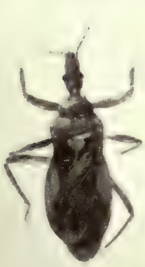
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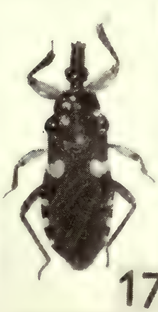
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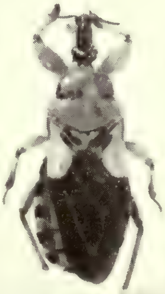
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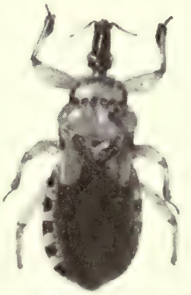
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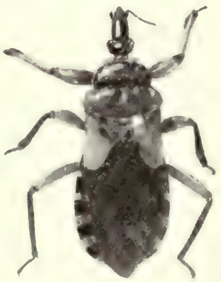
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ADDITIONS TO DESCRIPTIONS OF NEW OLETHREUTINAE AND CARPOSINIDAE IN THE BRITISH MUSEUM (NATURAL HISTORY)

BRITISH MUSEUM
14 SEP 1959
NATURAL HISTORY

A. DIAKONOFF

BULLETIN OF
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ENTOMOLOGY Vol. 8 No. 3
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BY

A. DIAKONOFF

Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands

Pp. 119–126 ; *Plates* 5–10 ; 2 *Text-figures*

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ADDITIONS TO DESCRIPTIONS OF NEW OLETHREUTINAE AND CARPOSINIDAE IN THE BRITISH MUSEUM (NATURAL HISTORY)

By A. DIAKONOFF

In 1950 I described ten new species of South Asiatic Olethreutinae and Carposinidae in the *Bull. Brit. Mus.* (*Nat. Hist.*), *Ent.* **1** : 273–300, Pls. 3–8, text-figs. 1–2. The types of the species were deposited in the British Museum (Natural History). At that time I was not able to give illustrations to the descriptions, except for figures of the genitalia of two species, viz., of *Bactra coronata* Diak. and *B. monochorda* Diak.

Now at last, after a long delay, I am able to carry my original intention into effect, and publish the illustrations of the other eight species, together with descriptions and figures of their genitalia.

I am indebted to Mr. J. D. Bradley, Department of Entomology, British Museum (Natural History), London, for his kind interest and help with this study.

Some corrections have become necessary since the publication of my paper. A new genus is proposed below for the reception of one species of the Carposinidae, and two other species of this family are transferred to other genera, described since. The attribution of the three Olethreutinae to the genus *Acroclita* Lederer is somewhat dubious, and may remain so till a basic revision of the South Asiatic genera of the subfamily is carried out, which is my intention. Neither am I sure of the combination of the male and the female of *Acroclita lithoxoa* Diak : they might prove to belong to different species.

1. *Acroclita argyrophenga* Diak.

(Pl. 5, fig. 1 ; Pl. 7, fig. 13)

(*tom. cit.*, p. 276)

FEMALE GENITALIA. Eighth segment distinctly sclerotized; ventrite with a deep split, ending with an oval excision encircling ostium bursae. The ostium with a hyaline ventral wall, with the rim produced into a short, triangular lip, encircled by an annular, thickened, and sclerotized structure, open dorsally. Colliculum strongly sclerotized, short, irregular. Corpus bursae pear-shaped, upper edge with an inverted V-shaped ridge. Signa moderate, slender hooks on small round basal plates. (Male cornuti present, small and slender blades.) (Slide No. 2758, holotype.)

Note. The holotype specimen is a female, not a male as stated in the original description.

2. ***Acroclita falcigera*** Diak.

(Pl. 5, fig. 2 ; Pl. 8, figs. 16, 17)

(*tom. cit.*, p. 278)

Female genitalia. Eighth segment sclerotized. Sterigma modified, being a semi-oval plate, rounded below (rostrally), twice emarginate above (caudally). Ostium bursae, a transverse-triangular split, with a produced and emarginate ventral rim. Colliculum short, strong, subglobular, finely denticulate on the two sides above. Corpus bursae large, pear-shaped, with an inverted V-shaped sclerotization above. Signa, two aciculate spikes, one flattened, with two sharp edges, another with three. (Slide No. 2756.)

3. ***Acroclita lithoxoa*** Diak.

(Pl. 5, figs. 3, 4 ; Pl. 7, figs. 12, 14)

(*tom. cit.*, p. 278)

Male genitalia. Tegumen slender, triangularly depressed. Uncus, a weak slender conus. Socius moderate. Tuba analis large and wide. Gnathos a slender, undulate band. Vinculum represented by an elongate, semi-ellipsoid sclerite on each side, interconnected mesially, and apparently articulating there. Valva simple, rather broad, cucullus obliquely rounded and bristly, with a row of small marginal thorns towards dorsal angle. Juxta small, caulis rather short. Aedeagus moderate, cornuti a sheaf of slender sinuate spines. (Slide No. 2755, holotype.)

Female genitalia. Eighth segment not sclerotized. Ostium bursae shaped as an elongate, longitudinal body, narrowed in middle and dilated at extremities, densely scaled (scales removed in mount) ; upper extremity of this body representing the ostium bursae proper, thickened, aciculate, supported by a subapical annular band. Colliculum strongly sclerotized, an irregular tube with several longitudinal folds. Corpus bursae pear-shaped, its wall modified (submalleate). Signa, two slender, little-curved hooks, with rather large, ill-defined basal plates. (Slide No. 2757, allotype.)

4. ***Blipta drachmophora*** (Diak.) comb. nov.

(Pl. 6, fig. 8 ; Pl. 8, fig. 15)

Meridarchis drachmophora Diak., 1950, *tom. cit.* 298.

The present species is transferred to the genus *Blipta* Diakonoff, 1954 (*Verh. Ned. Akad. Wet., Nat.* (2) **49**, No. 4 : 156) because of the close similarity of the male genitalia, and in spite of the following minor discrepancies of the external structure along with the more pronounced differences in the neuration of the hind wing. The following particulars should be added to the description of the genus *Blipta*.

Labial palpus with median segment more rough in middle of upper and lower edges; terminal segment shorter than in the type of the genus. Fore wing with veins 3 and 4 very closely approximated at base, almost connate; veins 8 and 9 closely approximated and contiguous along basal portion. Hind wing with veins 3 and 4 connate from angle; 5 and 6 absent; 7 to apex.

MALE GENITALIA. Tegumen rather high. Socius present in the shape of a large, lateral flap of tegumen, with a rounded process, directed caudad; the flap edged throughout by a dense fringe of bristles. Uncus strong, shaped as a bird's head, rounded and with a ventral beak. Vinculum long, triangularly projecting. Valva with a short disc and a very narrow, long cucullus; sacculus distinct, at apex projecting with a strong, blunt and sclerotized point; harpe, a moderate, slender, sclerotized, free arm, situated below base of costa of the valva, bristly at the top. Aedeagus broadly spoon-shaped, right side produced into a pointed blade, folded over disc, with a bristled subapical process on the inner side. (Slide No. 2749, holotype.)

5. ***Mesodica dryas*** (Diak.) comb. nov.

(Pl. 6, figs. 10, 11; Pl. 9, figs. 20, 21; Pl. 10, figs. 23, 24)

Meridarchis dryas Diak., 1950, *tom. cit.* 298.—Diakonoff, 1949, *Treubia*, **20** : 43.

MALE GENITALIA. Tegumen broad. Uncus, a long, little-curved, slender hook. Gnathos robust, two curved, pending arms, connected in middle, with ventral edge aciculate; behind (dorsally) the connection, a semi-oval transverse sclerite. Valva oval, broad, semi-membranous, densely long-haired on the outer side (hairs removed in mount), basal external portion of valva forming a semicircular lobe, serving as attachment for a dense tuft of long hairs; a remarkable and interesting development are the coremata on the ninth segment, visible on the right side of the photograph; base of sacculus sclerotized, forming a short, marginal rod ending in a transverse flattened process (harpe). Vinculum rather strong, dilated. Aedeagus spoon-shaped, deeply bicuspidate, right cusp slender, each cusp edged on both sides by a fringe of strong bristles; left cusp also with two longitudinal groups of bristles in the middle, viz., short spines at the left side, long spines at the right. (Slide No. 2752, holotype.)

FEMALE GENITALIA. Eighth segment forming a sclerotized double ring. Sterigma and ostium bursae not modified. Ductus bursae, a weak tube with a finely verrucose wall. Corpus bursae simple, tubular. Signa absent. (Slide No. 2753, allotype.)

Note. The species is extremely close to *Mesodica infuscata* Diak., from Java, described in *Treubia*, **20** : 43, 1949. In that paper I also referred to the present species, a description of which was in press at the time. *M. dryas* differs from *infuscata* by the slightly different shape of the gnathos and by the presence of sclerotizations along the base of the sacculus in the former species, while a discal harpe is absent. Also the aedeagus in *dryas* has a different shape.

It may be mentioned that the description of the gnathos in *infuscata* (l.c.: 44) is not quite correct, as the gnathos in that species is also entire and not paired.

6. *Meridarchis ensifera* Diak.

(Pl. 6, fig. 9 ; Pl. 9, figs. 18, 19)

(*tom. cit.*, 298)

Female genitalia. Ostium bursae concealed behind a large semi-oval membranous plate. Sterigma shaped as a smaller, submembranous, wrinkled body. Ductus bursae, a rather broad tube, with a verruculose wall. Corpus bursae simple, tubular anteriorly, abruptly dilated and pear-shaped posteriorly. Signa absent. (Slide No. 2750, holotype.)

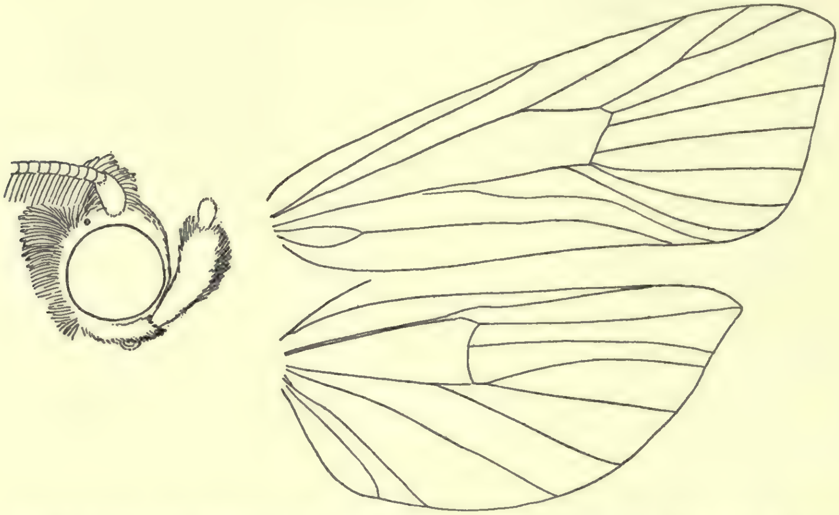

Fig. 1. *Peragrarchis rodea* (Diak.) gen. nov., ♂, sketch of the head and the wing neuration

PERAGRARCHIS gen. nov.

(Text-figs. 1, 2 ; Pl. 5, fig. 7)

Head with appressed scales, with rough tufts on vertex. Antenna 3/4, long-ciliate in male, ciliations 3, fine. Ocellus posterior. Proboscis weak. Labial palpus strongly ascending, palpi slightly divergent ; median segment dilated in middle by rough scales above and beneath ; terminal segment exposed, rather short, thick, rounded. Thorax without a crest. Abdomen normal. Posterior tibia with loose, fine and long hairs.

Fore wing with tufts of raised scales on surface ; with vein 2 from near angle, 3 and 4 closely approximated at base, from angle, 8 and 9 stalked, 10 from 3/4 of upper edge of cell, 11 absent. Hind wing with a cubital pecten ; vein 2 from towards angle, 3 and 4 connate from angle, 5 absent, 6 weak, parallel to 7, 7 to apex.

Male genitalia. Uncus simple, pointed. Socius parietal. Saccus developed. Valva with a short disc and a strong sacculus ending in a dentate transverse blade in a round impression; cucullus bipartite to the base, arms long and narrow. Aedeagus very long, slender, dilated below middle; point asymmetrical, acute.

Type of the genus: *Meridarchis rodea* Diakonoff, 1950, ♂.

A development of *Meridarchis* Zeller, 1867; very distinct by reason of the peculiar bipartite cucullus in the male and the absence of vein 11 in the fore wing.

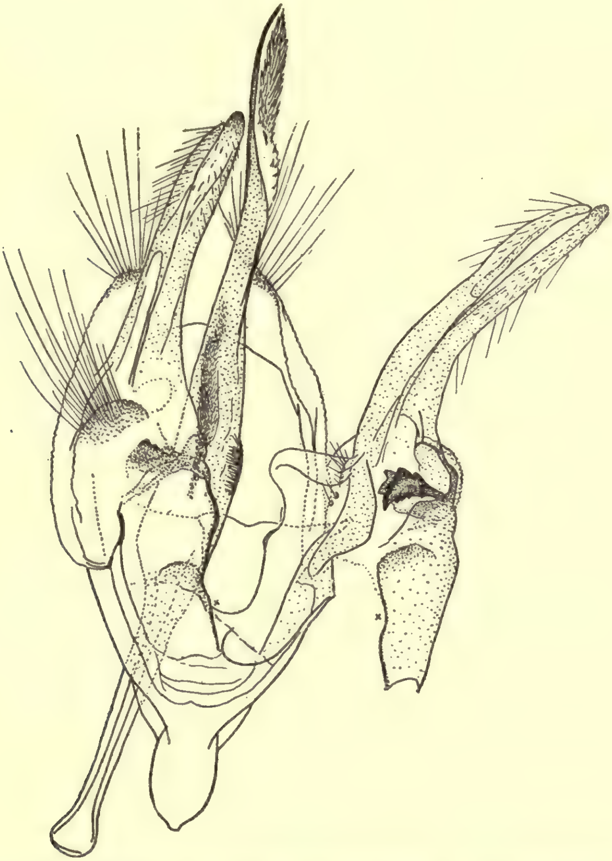

FIG. 2. *Peragrarchis rodea* (Diak.) gen. nov., male genitalia.

7. **Peragrarchis rodea** (Diak.) comb. nov.

(Text-figs. 1, 2; Pl. 5, fig. 7)

Meridarchis rodea Diak., 1950, *tom. cit.* 299.

MALE GENITALIA. Tegumen high, triangular. Uncus moderate, conical, pointed. Socius represented by a group of long bristles, implanted on the shoulder of the tegumen ("parietal"). Vinculum strong, with an elongate-oval saccus. Valvae fused along the basal portion of sacculi (loosened in mount; marked in the figure by a ×), sclerotized; sacculus with a blunt, minutely denticulate, subapical ridge at apex, with a sclerotized, round excavation from which rises a transverse, dentate blade; cucullus sclerotized, bipartite to the base, halves linear; a submembranous, verruculose, rounded tumescence bearing a pencil of hairs on the outer side of valva, opposite base of sacculus. Aedeagus long and slender, moderately sclerotized, dilated before middle; with two longitudinal patches of spines, right series short, with stout spines, left long, with several rows of small spines; apex asymmetrical, acute, with a subapical, dense patch of moderate spines. (Slide No. 2751, holotype.)

8. ***Picrorrhyncha atribasis*** Diak.

(Pl. 5, figs. 5, 6; Pl. 10, fig. 22)

(*tom. cit.*, 300)

FEMALE GENITALIA. Ostium bursae a simple, membranous, truncate tube, with a subapical, inverted-V-shaped sclerite in ventral wall. Ductus bursae long, less than its upper half, with a broad and strong cestum, curved-up at the end; ductus bursae beyond this (as far as corpus bursae) with verrucose wall containing roundish impressions. Corpus bursae simple, egg-shaped, with a long and narrow collum. Signa absent. (Slide No. 2754, holotype.)

The abdomen of the male allotype specimen was already missing at the time of the original description.

PLATE 5

FIG. 1.	*Acroclita argyrophenga* Diak., holotype ♀.
FIG. 2.	*A. falcigera* Diak., holotype ♀.
FIG. 3.	*A. lithoxoa* Diak., holotype ♂.
FIG. 4.	The same, allotype ♀.
FIG. 5.	*Picrorrhyncha atribasis* Diak., holotype ♀.
FIG. 6.	The same, allotype ♂.
FIG. 7.	*Peragrarchis rodea* (Diak.), holotype ♂.

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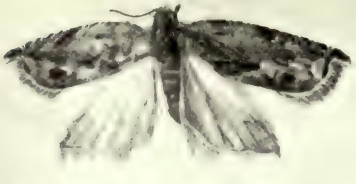

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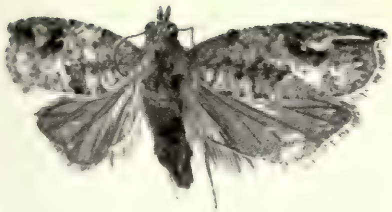

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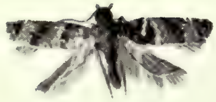

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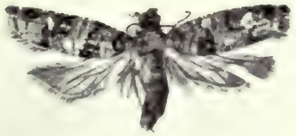

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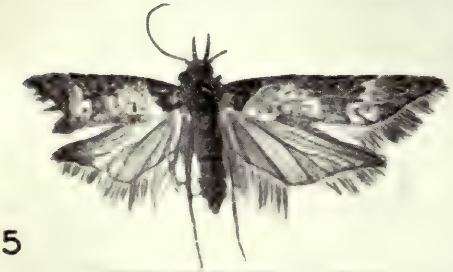

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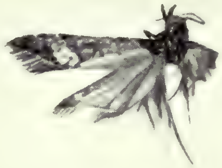

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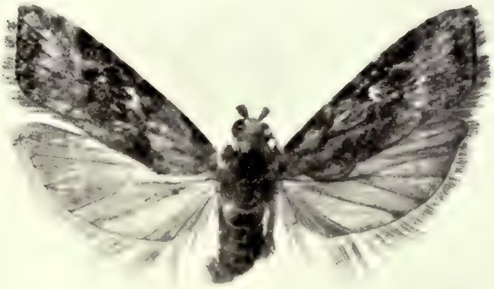

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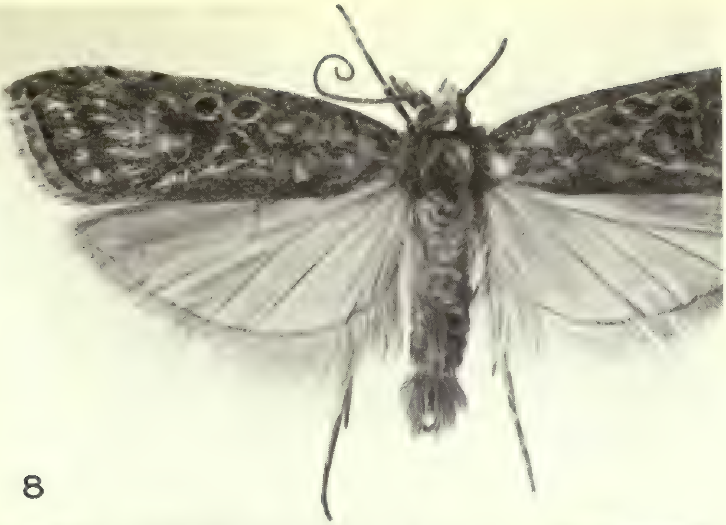
PLATE 6

FIG. 8. *Blipta drachmophora* (Diak.), holotype ♂.
FIG. 9. *Meridarchis ensifera* Diak., holotype ♀.
FIG. 10. *Mesodica dryas* (Diak.), holotype ♂.
FIG. 11. The same, allotype ♀.



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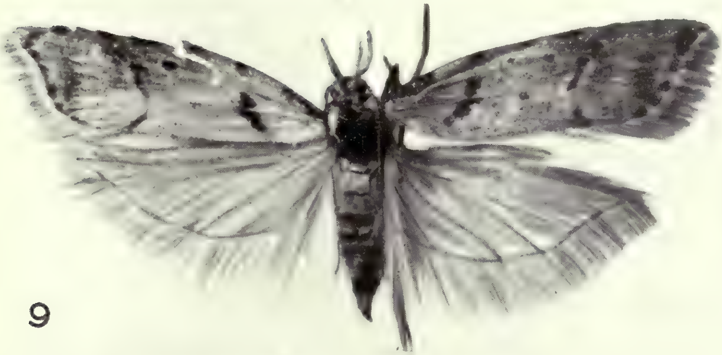

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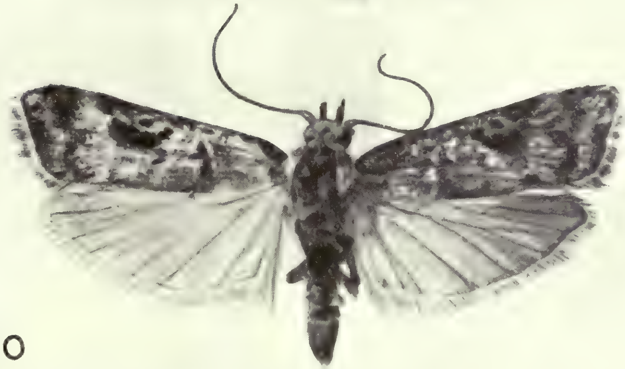

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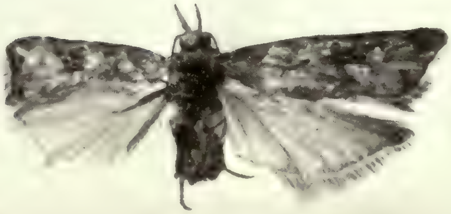

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PLATE 7

Fig. 12. *Acroclita lithoxoa*, female genitalia.
Fig. 13. *A. argyrophenga*, female genitalia.
Fig. 14. *A. lithoxoa*, male genitalia.

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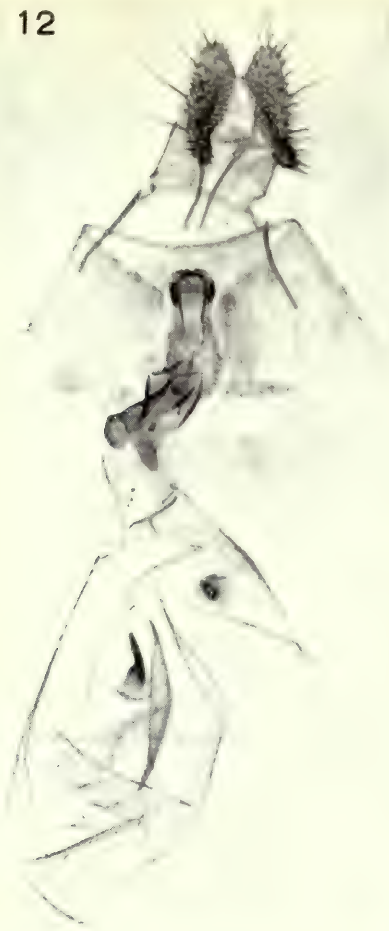

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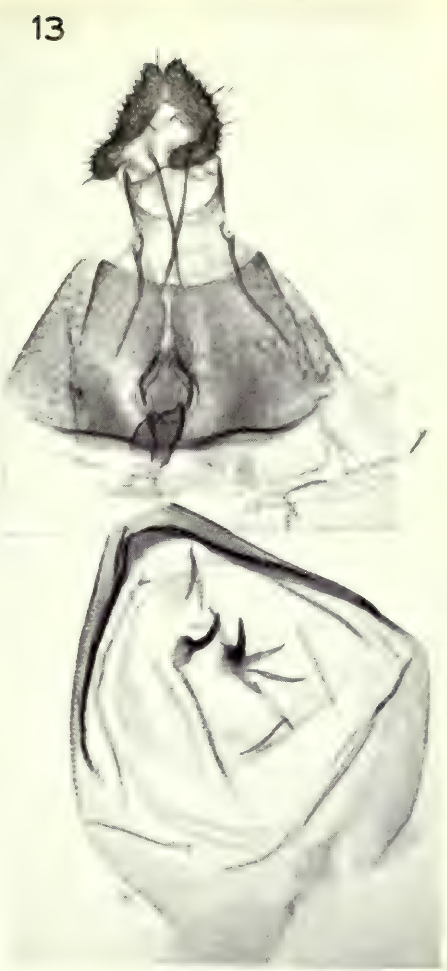

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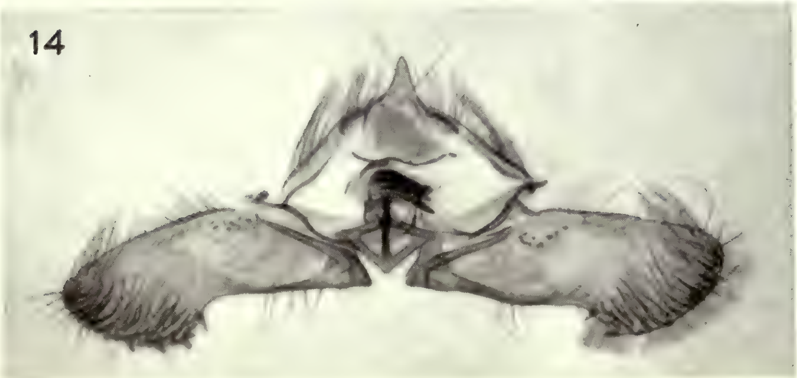
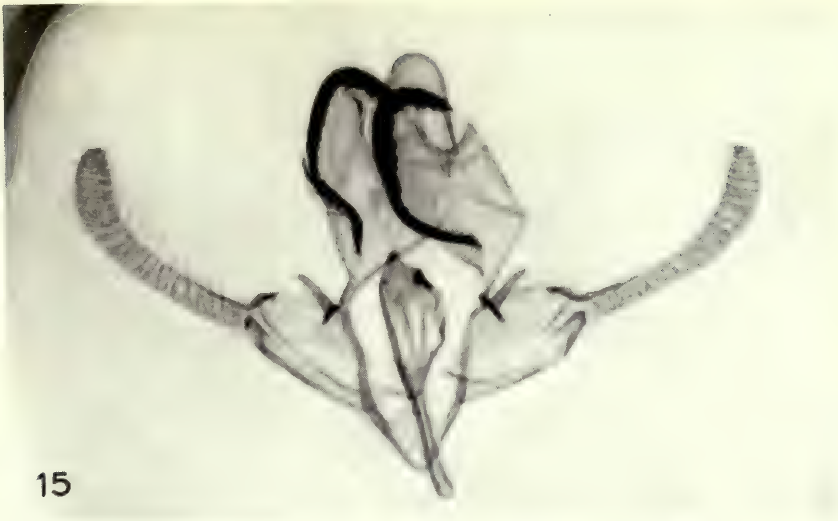


PLATE 8

Fig. 15. *Blipta drachmophora,* male genitalia.
Fig. 16. *Acroclita falcigera,* ovipositor and sterigma.
Fig. 17. The same, bursa copulatrix.



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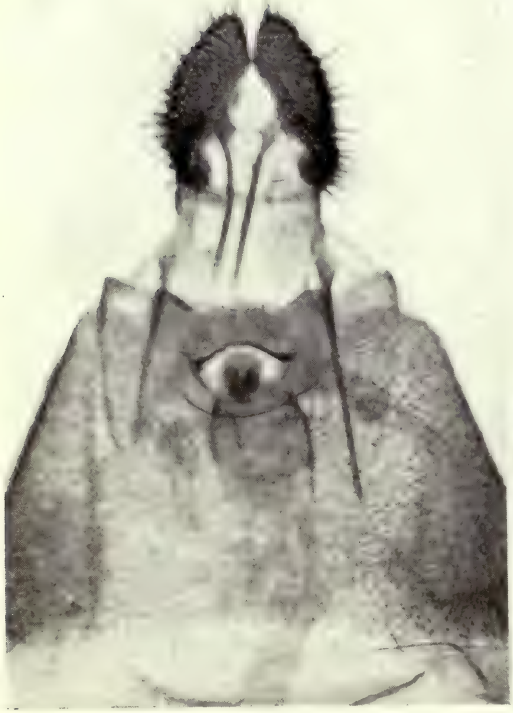

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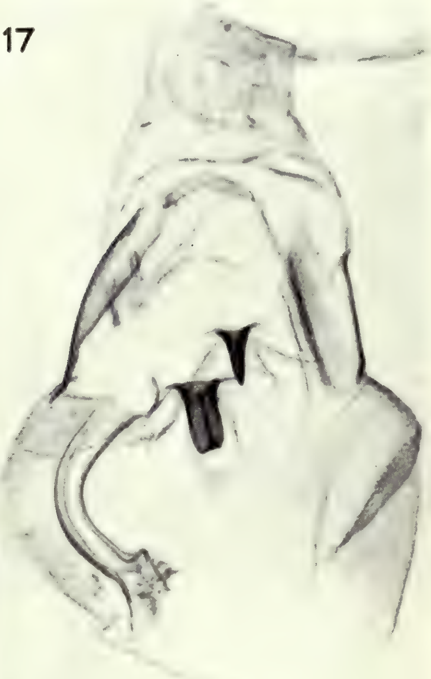

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PLATE 9

Fig. 18. *Meridarchis ensifera*, ovipositor and sterigma.
Fig. 19. The same, bursa copulatrix.
Fig. 20. *Mesodica dryas*, aedeagus.
Fig. 21. The same, male genitalia.

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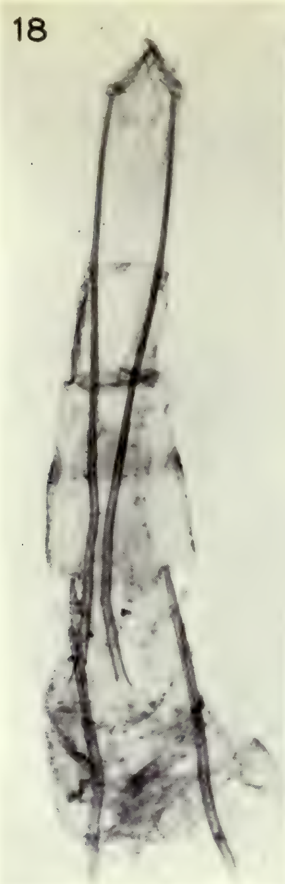

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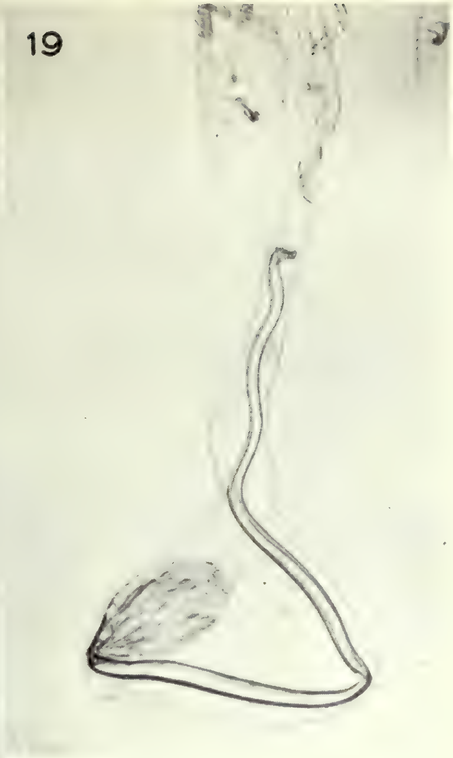

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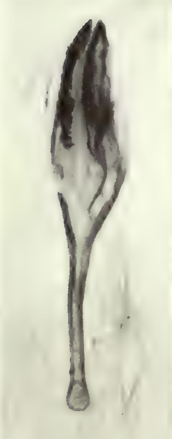

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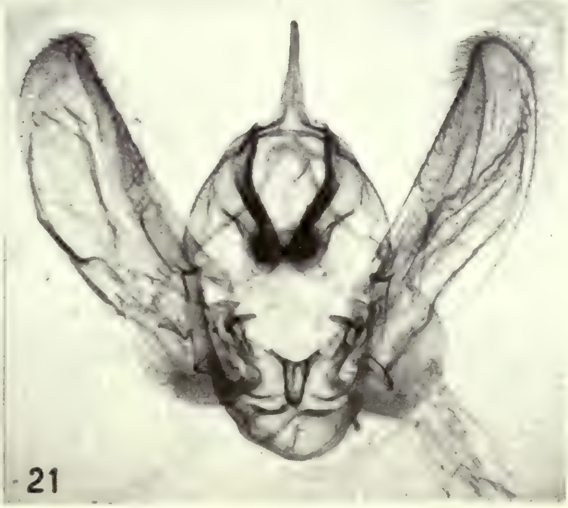
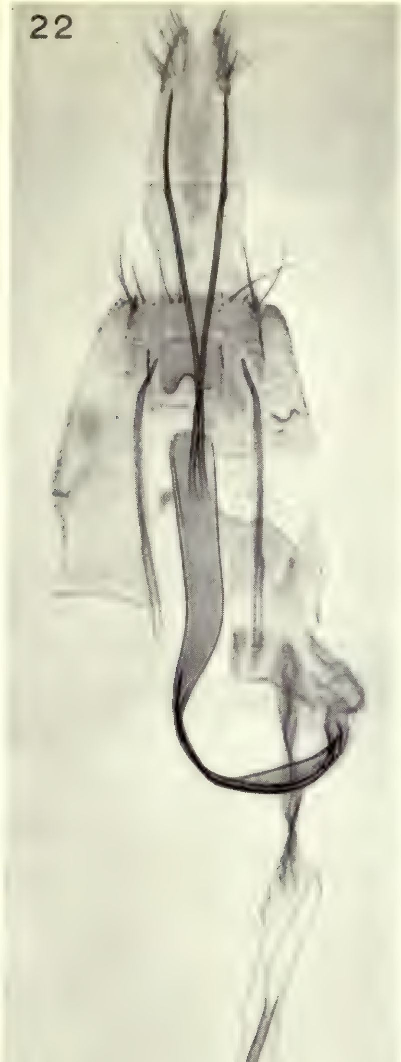


PLATE 10

FIG. 22. *Picrorrhyncha atribasis*, female genitalia.
FIG. 23. *Mesodica dryas*, ovipositor and sterigma.
FIG. 24. The same, bursa copulatrix.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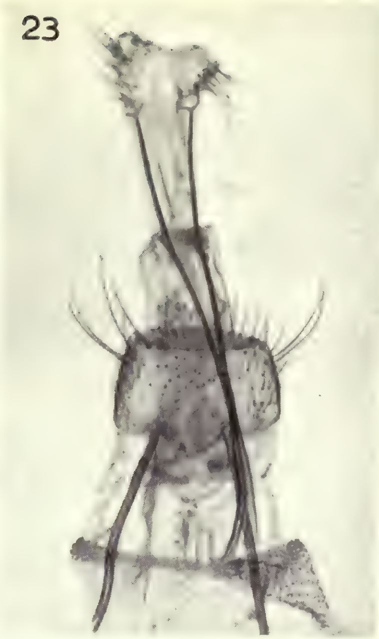
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A REVISION OF THE TERMITES OF THE GENUS *AMITERMES* FROM THE ETHIOPIAN REGION (ISOPTERA, TERMITIDAE, AMITERMITINAE)

BRITISH MUSEUM
14 SEP 1959
NATURAL HISTORY

W. A. SANDS

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BY

W. A. SANDS, M.Sc., F.R.E.S.

Colonial Termite Research Unit

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Pp. 127–156 ; 6 *Text-figures*

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A REVISION OF THE TERMITES OF THE GENUS *AMITERMES* FROM THE ETHIOPIAN REGION (ISOPTERA, TERMITIDAE, AMITERMITINAE)

By W. A. SANDS, M.Sc., F.R.E.S.

THE subfamily Amitermitinae is represented in the Ethiopian zoogeographical region by comparatively few genera, of which the most important are the tropicopolitan *Amitermes* and *Microcerotermes.* The former is dealt with here, the revision being based mainly on the collections of the Colonial Termite Research Unit at the British Museum (Nat. Hist.).

The generitype of *Amitermes* Silvestri is the South American *A. amifer,* but the genus is represented in all the main zoogeographical regions including Australia and the Palaearctic. The genus derives its name from the characteristically hooked soldier mandibles of most of its members.

The revised list for the Ethiopian region consists of thirteen species, the synonyms of each being included in plain type :

- *Amitermes acinacifer* sp. nov.
- *Amitermes braunsi* Fuller (1922)
- *Amitermes evuncifer* Silvestri (1912)
- *Amitermes hastatus* (Haviland) (1898)
    - Amitermes atlanticus Fuller (1922)
    - Amitermes capicola Silvestri (1914)
    - Amitermes gunni Fuller (1922)
    - Amitermes kellyi Fuller (1922)
    - Amitermes kenhardti Fuller (1922)
    - Amitermes libertatis Fuller (1922)
    - Amitermes londonensis Fuller (1922)
    - Amitermes murraysburgi Fuller (1922)
    - Amitermes runconifer Silvestri (1908)
    - Amitermes schoombiensis Fuller (1922)
    - Amitermes zuurbergi Fuller (1922)

- *Amitermes importunus* sp. nov.
- *Amitermes lönnbergianus* (Sjöstedt) (1911)
    - Amitermes lacertosus Ghidini (1941)

- *Amitermes messinae* Fuller (1922)
    - Amitermes harleyi Harris (1957)

Amitermes sciangallorum Ghidini (1941)
Amitermes somaliensis Sjöstedt (1927)
Amitermes spinifer Silvestri (1914)
Amitermes stephensoni Harris (1957)
Amitermes truncatidens sp. nov.
Amitermes unidentatus (Wasmann) (1897)
    Amitermes elongatus Silvestri (1914)
    Amitermes limpopoensis Fuller (1922)
    Amitermes macrocephalus Ghidini (1941)
    Amitermes meruensis (Sjöstedt) (1911)

Three other species are removed from the list but not synonymized with others, namely :

" *Amitermes bechuana* " Fuller (1922). This is only known from the alate caste. The cotype has been examined, and it does not belong to the genus *Amitermes*, but is a member of the subfamily Termitinae.

" *Amitermes paucinervius* " (Silvestri) Fuller (1922). Silvestri's illustration indicates that this species does not belong to *Amitermes*, but is probably a member of the Termitinae.

" *Amitermes seminotus* " (Silvestri) Fuller (1922). The imago-worker mandibles illustrated by Silvestri are not those of *Amitermes*, but more closely resemble those of some members of the Termitinae, such as *Promirotermes*.

Sjöstedt's single record of *Amitermes hastatus* (Hav.) from Kilimandjaro, Tanganyika is included in *A. messinae* Fuller, on the grounds that subsequent extensive collecting in the area has produced only this species, and *A. hastatus* is otherwise unknown north of the River Zambezi.

The proposals now made for the reduction of a large number of species to synonyms are based on a study of the wide range of variation encountered in this genus. Not only has variation in structure to be considered but also differences in the individual variability of different species. It has frequently been found that characters which can be used to separate two particular species may be completely unreliable in the rest of the genus. Conversely, more general use has been made of some characters previously only used in a limited way, such as the presence of spines on the anterior coxae of the soldier caste first mentioned by Silvestri in *A. spinifer* (1914).

An account has been given by Hill (1942) of the wide range of variation in the soldier caste of an Australian species of *Amitermes*, and certain Ethiopian species have been found to be scarcely less variable. The head capsule shows a wide range of size and shape in plan view, but the profile is often more constant in outline. The mandibles commonly vary in size, thickness, in some cases in curvature, and in the degree of development of the median tooth. The variation in this tooth reaches the extreme of reversal of direction in one species, and in others, though fairly constant in position, varies from prominent to almost obsolete.

The shape and size of the clypeus, labrum, and gula, the degree of emargination of the pronotum, and the number and proportions of the antennal segments are not reliable specific characters for the soldier caste of *Amitermes*.

In the alate caste overall size, and the relative size and proportions of the eyes, ocelli, and fontanelle vary slightly. The fontanelle is depressed in some species, and in one this varies in degree from a flat surface to a deep, broad fossa. The degree and shape of the emargination of the posterior lobes of the meso- and metanota are not usable as specific characters. The variation in wing venation is such that the four wings of one specimen are often widely different.

Key to the Alates

Alates of the genus *Amitermes*, in Africa, are distinguishable by the following characteristics : labrum broader than long ; mandibles with apical tooth slightly shorter to slightly longer than first marginal ; eyes generally small, greatest diameter being shorter up to slightly longer than postclypeus ; fontanelle broad to elongate oval, usually centred on or behind a line joining posterior margins of eyes, depressed to a varying extent ; posterior margins of meso- and metanota broadly emarginate, forming obtuse angles. Small insects, head width 0·86–1·25 mm., wing length 8·0–13·0 mm.

1. Anterior margin of pronotum produced into a short emarginate median lobe (Text-fig. 2E) . . . . *A. messinae* Fuller
– Anterior margin straight or very slightly sinuate, entire or slightly emarginate . 2
2. Posterior margin of head approximately semicircular, evenly rounded . . . 3
– Posterior margin of head not approximately semicircular, slightly sinuate immediately behind eyes . . . . *A. stephensoni* Harris
3. Fontanelle area slightly to much larger than ocellus 4
– Fontanelle area not larger usually smaller than ocellus 5
4. Smaller species, width of head across eyes 1·00 mm.; diameter of eye 0·24 mm.; hind tibia up to 1·00 mm. Fontanelle distinctly behind line joining posterior margins of eyes. Ocellus longer than half greatest diameter of eye . . . *A. braunsi* Fuller
– Larger, head width over 1·04 mm. (mean 1·12) ; diameter of eye over 0·26 mm. (mean 0·30) ; hind tibia over 1·04 mm. (mean 1·20). Fontanelle on a line joining posterior margins of eyes. Ocellus one-third to two-fifths diameter of eye *A. unidentatus* (Wasmann)
5. Anterior coxae with one to five stout spine-like setae in line or group near middle of front surface. (Smaller, head width 0·86–0·93 mm.; eye 0·21–0·23 ; hind tibia 0·82–0·93) 6
– Anterior coxae without spine-like setae, ordinary setae may be present or very sparse. (Larger, head width over 0·95 mm.; eye 0·23–0·31 ; hind tibia 0·93–1·33) . . 7
6. Frons with two diverging grooves anterior to fontanelle . . . *A. spinifer* (Silvestri)
– Frons flat or only faintly indented anterior to fontanelle . . *A. somaliensis* Sjöstedt
7. Left mandible with third marginal tooth protruding beyond cutting edge connecting it to first marginal 8
– Third marginal does not project beyond cutting edge connecting it to first marginal *A. hastatus* (Haviland)
8. Larger, head width 1·18–1·25 mm.; hind tibia length 1·29–1·36 mm. *A. lönnbergianus* (Sjöstedt)
– Smaller, head width 1·00–1·11 mm.; hind tibia length 0·97–1·14 mm. . . . 9
9. Greatest diameter of eye 0·24 mm. Postclypeus strongly inflated, length more than half width . . . . *A. braunsi* Fuller
– Greatest diameter of eye over 0·28 mm. Postclypeus moderately inflated, length not more than half width, usually less 10
10. Frons with two diverging grooves anterior to fontanelle, and slightly rugose ; oval part of fontanelle less than twice as long as broad ; postclypeus markedly paler in colour than rest of head . . . . *A. truncatidens* sp. nov.
— Frons smooth ; oval part of fontanelle at least twice as long as broad ; postclypeus scarcely paler in colour than rest of head . . . . . *A. evuncifer* Silvestri

Key to the Soldiers

1. Spines present on anterior coxae (Text-fig. 6M) 2

– Spines absent from anterior coxae (Text-fig. 6N). (Thin colourless setae sometimes present in same position) 8

2. Tooth of mandible directed backwards in line of curve of inner margin . . 3

– Tooth more or less erect, projecting strongly from inner margin 4

3. Larger, head length 1·02–1·55 mm.; width 0·78–1·18; strong inward curve of outer margin of mandible commences at or proximal to median tooth *A. messinae* Fuller

– Smaller, head length 0·89–1·18 mm.; width 0·74–0·91; strong inward curve of outer margin of mandible commences distal to median tooth *A. spinifer* Silvestri

4. Mandibles elongate, almost straight, slightly elbowed with inflexed tips; inner margin strongly sinuate from tooth to apex (Text-fig. 6A). *A. acinacifer* sp. nov.

– Mandibles hooklike; inner margin a regular curve from tooth to apex . . 5

5. Mandibles slender, minimum width behind tooth about one-sixth length . . 6

– Mandibles stout, minimum width behind tooth one quarter or more of length (Text-fig. 6H) . . . . *A. somaliensis* Sjöstedt

6. Larger, head width over 0·95 mm.; head depth over 0·80 mm. . *A. stephensoni* Harris

– Smaller, head width over 0·91 mm.; head depth under 0·75 mm. 7

7. Mandibles strongly hooked, tooth at mid-point between base and apex, usually obliquely truncated or rounded (Text-fig. 6I) . . . *A. spinifer* Silvestri

– Mandibles curved, not hooked, tooth distinctly behind mid-point between base of tooth and apex, usually triangular (Text-fig. 6G) . . *A. sciangallorum* Ghidini

8. Tooth on mandible directed backwards in line of curve of inner margin (Text-fig. 6C) . . . . *A. hastatus* (Haviland)

– Tooth on mandible more or less erect, projecting from inner margin 9

9. Hind tibia 1·18–1·39 mm. long . . . . *A. lönnbergianus* (Sjöstedt)

– Hind tibia up to 1·14 mm. long 10

10. Tooth of mandible very prominent, truncated, separated from inner margin in front by a sharp change of curvature (Text-fig. 6, B, D, K) 11

— Tooth of mandible less prominent, separated from inner margin in front by a gradual change of curvature, seldom truncated (Text-fig. 6L) . *A. unidentatus* (Wasmann)

11. Anterior lobe of pronotum shorter than posterior . . *A. importunus* sp. nov.

— Anterior lobe of pronotum as long as or longer than posterior 12

12. Vertex generally somewhat inflated behind fontanelle with change of curvature between this fold and dorsal surface of head (Text-fig. 5K). Mandibular tooth more or less transversely truncated (Text-fig. 6K) . . *A. truncatidens* sp. nov.

— Vertex not inflated behind fontanelle, dorsal surface of head evenly curved from fontanelle to occiput (Text-fig. 5B). Mandibular tooth obliquely truncated or rounded (Text-fig. 6B) . . . . *A. evuncifer* Silvestri

(*Note.* Exceptions to couplet 12 will be found, these two species being very closely related and difficult to separate.)

A Note on Distribution

The most noteworthy feature which has become apparent during revision of this very successful genus is the comparatively small number of species by which it is represented in the Ethiopian region. The list can be roughly subdivided into even smaller groups of species occurring in each of the main vegetation zones of the region, and in these zones different species occupy comparable ecological niches. As might be expected there is some degree of overlapping at the limits of distribution, but in each zone the fauna is limited to a few species of differing habits.

The distribution of the *Amitermes* of the Ethiopian region is shown on the accompanying map (Text-fig. 1).

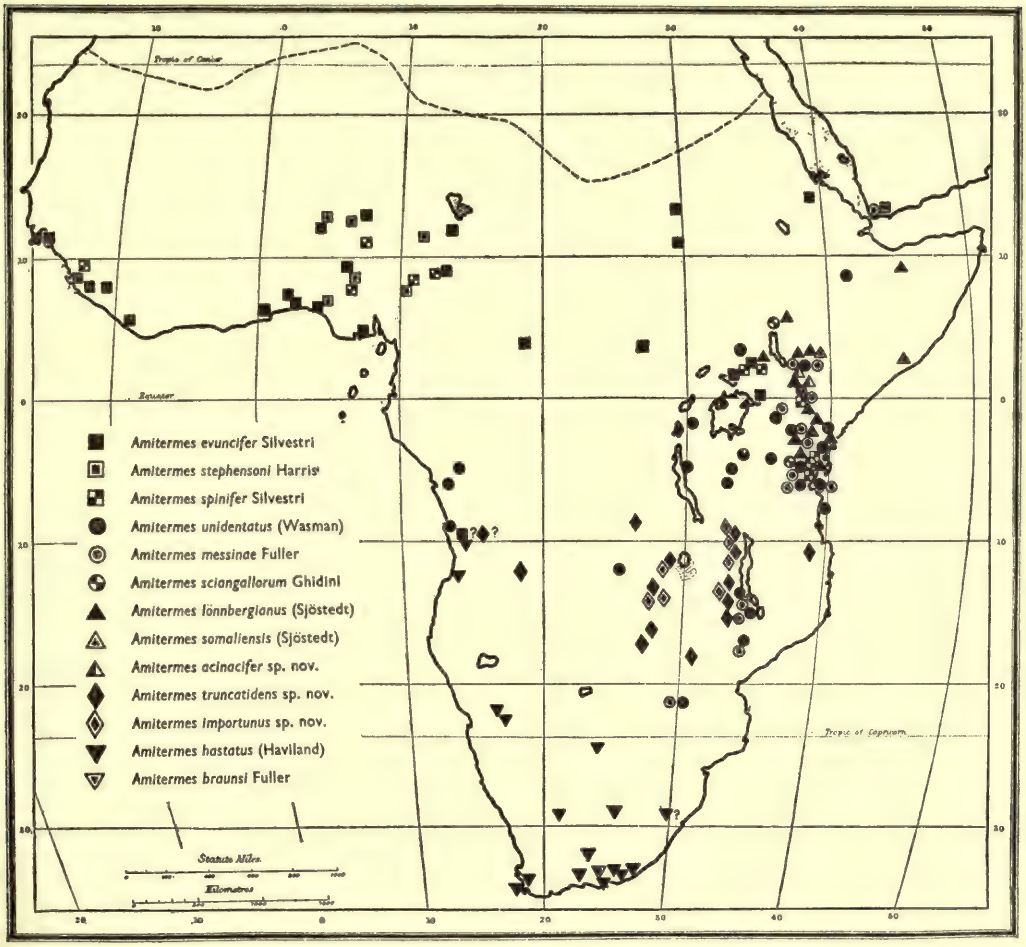
Tropic of Cancer
Equator
Tropic of Capricorn
■ Amitermes evuncifer Silvestri
▣ Amitermes stephensoni Harris
▚ Amitermes spinifer Silvestri
● Amitermes unidentatus (Wasman)
◎ Amitermes messinae Fuller
◐ Amitermes sciangallorum Ghidini
▲ Amitermes lönnbergianus (Sjöstedt)
△ Amitermes somaliensis (Sjöstedt)
△ Amitermes acinacifer sp. nov.
◆ Amitermes truncatidens sp. nov.
◇ Amitermes importunus sp. nov.
▼ Amitermes hastatus (Haviland)
▽ Amitermes braunsi Fuller
Statute Miles
Kilometres
?

FIG. 1. Map of the distribution of the genus *Amitermes* in the Ethiopian zoogeographical region.

AMITERMES Silvestri

Amitermes acinacifer sp. nov.

(Text-figs. 4A; 5A; 6A)

IMAGO. Unknown.

SOLDIER. Head capsule yellow to yellow-brown; mandibles pale brown to chestnut brown; antennae and legs pale yellow, rest of body yellowish-white except where gut contents show through abdomen.

Head in plan view, slightly longer than broad, sides curved, posterior margin regularly rounded. In profile, continuously curved from fontanelle to occiput, curve shallower in front. Mandibles elongate, almost straight, slightly elbowed with inflexed tips ; tooth within basal third, prominent, erect, directed slightly forwards ; inner margin strongly sinuate from base of tooth to apex. Antennae, 13–14 segmented, II, IV and V subequal, III half as long as these, or II and V subequal, III and IV subequal and half as long as these. Head capsule with sparsely scattered setae.

Pronotum with regularly curved anterior border, not emarginate. Anterior coxae with 3–4 short stout spines grouped approximately in middle of front surface. Rest of legs with numerous spines and long setae.

	Range in mm.	Mean
Length of head capsule	0·93–0·97	0·96
Greatest width of head	0·76–0·82	0·78
Width of head at base of mandibles	0·61–0·63	0·61
Depth of head capsule	0·61–0·64	0·63
Length of pronotum	0·32	
Width of pronotum	0·47–0·49	0·47
Length of hind tibia	0·70–0·78	0·73

WORKER. Head yellow, antennae and rest of body yellowish-white. Third marginal tooth of left mandible does not usually protrude beyond cutting edge connecting it with first marginal.

Described from numerous soldiers and workers from localities in the Northern Frontier Province of Kenya.

This species differs completely in the form of the soldier mandible from any other known African species, and appears in this character to resemble the Australian genus *Drepanotermes*.

TYPE LOCALITY. KENYA ; Marsabit district, 27 miles from Marsabit township on the Isiolo Road (Altitude 2,000 ft. approx.), 5.iii.53 (W. A. Sands, Coll., No. 442).

Holotype soldier and paratypes in British Museum (Natural History).

OTHER RECORDS. KENYA : Northern Frontier Province, 35 miles north of Uaso Nyero, and at Marsabit, on Mega and Moyale Roads, 1953 (W. A. Sands).

All the records of this species are from dead wood ; the nest proper has not been discovered.

Amitermes braunsi Fuller

(Text-figs. 2A ; 3A ; 4B)

Hamitermes braunsi Fuller, 1922, *S. Afr. J. nat. Hist.* **3** (2) : 70–131, South Africa : Willowmore.

IMAGO. *Female* : Colour uncertain due to fading in old specimen.

Posterior margin of head almost semicircular ; fontanelle as large as or larger than ocelli, with narrow pale extension anteriorly, partially depressed or nearly flat, centred distinctly behind a line joining posterior margins of eyes ; eyes about as long as postclypeus ; ocelli large, broad, oval, separated from eyes by slightly less than own width ; postclypeus slightly longer than half breadth, inflated, anterior margin straight, posterior margin evenly convex; antennae 15 segmented, III shorter than IV, IV and V subequal.

Pronotum narrower than head across eyes, anterior margin straight, sides broadly rounded, converging to sinuate posterior.

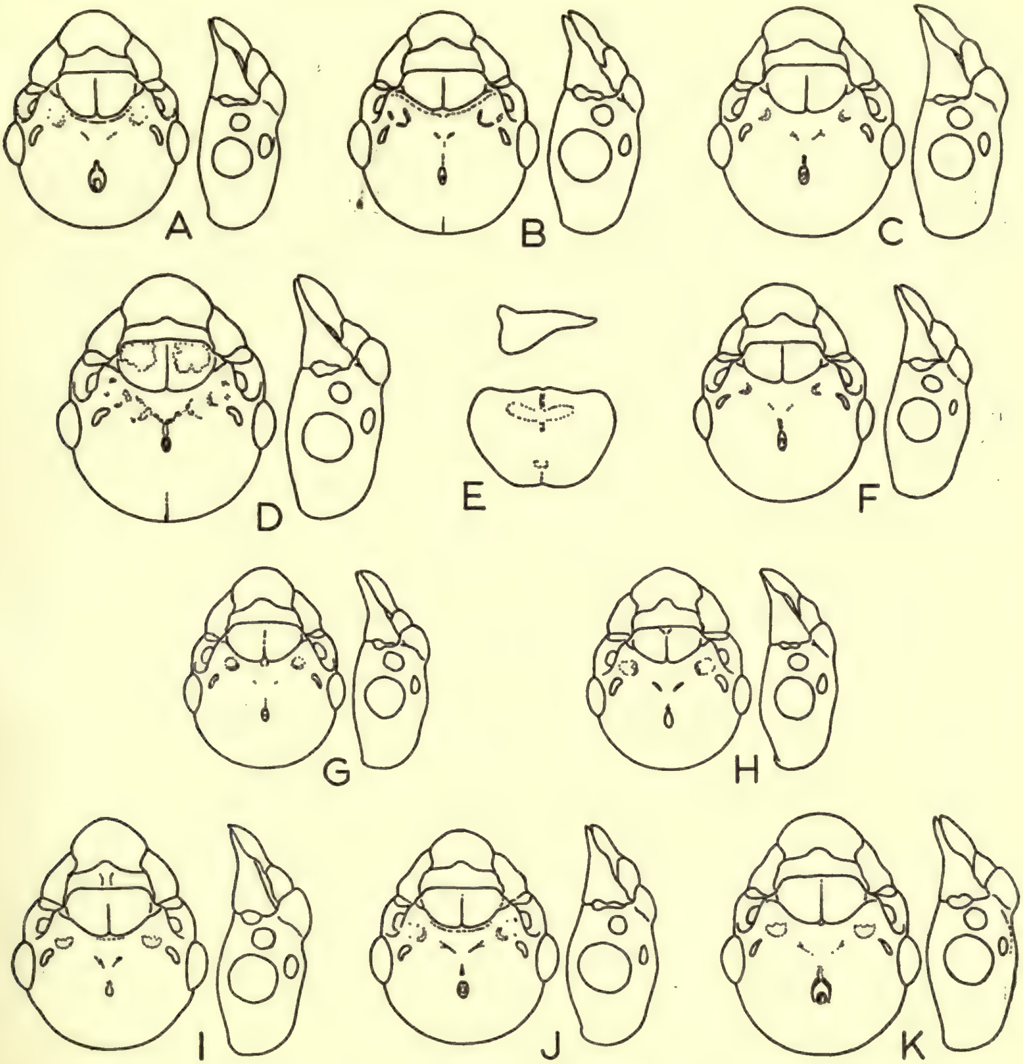

FIG. 2. A–D and F–K, plan and side views of heads of imagos ; E, side and plan view of pronotum of imago of *Amitermes messinae* Fuller.

A. *Amitermes braunsi* Fuller ; B. *Amitermes evuncifer* Silvestri ; C. *Amitermes hastatus* (Haviland) ; D. *Amitermes lönnbergianus* (Sjöstedt) ; F. *Amitermes messinae* Fuller ; G. *Amitermes somaliensis* Sjöstedt ; H. *Amitermes spinifer* Silvestri ; I. *Amitermes stephensoni* Harris ; J. *Amitermes truncatidens* sp. nov.; K. *Amitermes unidentatus* (Wasmann).

Male, as female, except for slightly larger fontanelle.

	mm.
Head width across eyes .	1·00
Greatest diameter of eye .	0·24
Ocellus	0·09×0·13
Ocellus to eye . . .	0·07–0·08
Width of pronotum . .	0·78
Length of pronotum . .	0·47
Length of hind tibia . .	0·97–1·00
Length of fore wing . .	9·6

WORKER. Left mandible with third marginal tooth protruding beyond cutting edge connecting it to first marginal; distance between first and third marginals greater than that between apical and first marginal.

Anterior coxae without spines.

Described from cotypes from type colony. The unique soldier is missing from the type series, and cannot be included in this revision.

It is possible that *A. importunus* sp. nov. described in succeeding pages from soldiers and workers only may be the same species as *A. braunsi* Fuller. In the absence of the soldier type of the latter this cannot be confirmed, particularly since the worker left mandible of *A. importunus* is different in its proportions from that described above.

Amitermes evuncifer Silvestri

(Text-figs. 2B; 3B; 4C; 5B; 6B)

Termes unidentatus Wasmann, 1897, *Abh. Senckenb. Ges.* **21**: 137–182, Gold Coast record only.
Hamitermes evuncifer Silvestri, 1912, *Ann. Mus. civ. Stor. nat. Genova*, **45**: 211–255, Portuguese Guinea: Bolama, Rio Cassine.
Hamitermes evuncifer var. *heterocera* Silvestri, 1914, *Boll. Lab. zool. Portici*, **9**: 3–146.
Amitermes unidentatus subsp. *evuncifer* Silvestri: Sjöstedt, 1926, *Ent. Tdskr.*, **47**: 238–246 and Sjöstedt, 1926, *K. svenska Vetensk. Akad. Handl.* (3), **3** (1): 1–419.
Amitermes (*Amitermes*) *evuncifer* Silvestri; Emerson, 1928, *Bull. Amer. Mus. nat. Hist.* **57**: 401–574.

IMAGO. The following data and measurements must be added to Sjöstedt's description: Fontanelle an elongate oval, often partially or entirely depressed, smaller than ocelli. Third marginal tooth of left mandible protrudes beyond cutting edge connecting it with first marginal; distance between points of apical and first marginal less than distance between first and third marginal.

	Range in mm.	Mean
Width of head across eyes . .	1·02–1·11 .	1·06
Eye, greatest diameter . . .	0·28–0·31 .	0·30
Ocellus	0·06–0·09×0·10–0·16 .	0·08×0·12
Ocellus to eye	0·02–0·07 .	0·05
Width of pronotum . . .	0·86–0·97 .	0·89
Length of pronotum . . .	0·54–0·61 .	0·59
Length of hind tibia . . .	1·00–1·14 .	1·07
Length of fore wing . . .	8·00–10·7 .	9·5

SOLDIER. Range of variation in size much greater than previously recorded. Spines absent from anterior coxae.

	Range in mm.	Mean
Length of head capsule	1·14–1·66	1·42
Greatest width of head	1·02–1·30	1·17
Width of head at base of mandibles	0·70–0·87	0·80
Depth of head	0·82–1·00	0·96
Length of left mandible	0·61–0·75	0·71
Length of pronotum	0·30–0·40	0·35
Width of pronotum	0·61–0·75	0·63
Length of hind tibia	0·78–1·11	0·99

WORKER. Colour yellowish-white. Larger than preceding three species. Mandible similar to that of imago.

A. evuncifer can only be distinguished from *A. truncatidens* sp. nov. with difficulty, in the alate caste by the smoother frons and in the soldier by the less inflated vertex and the slightly more obliquely truncated mandibular tooth. It is separable from *A. importunus* sp. nov. by the longer anterior lobe of the pronotum and the more evenly rounded head profile.

A. evuncifer var. *heterocera* Silvestri is part of the normal range of variation, and not a distinct variety.

SIERRA LEONE: Freetown, Bo, Kenema, 1958 (W. Wilkinson).

GHANA: Kumasi, 1958 (W. Wilkinson); Aburi, Nkawkaw, 1955 (W. V. Harris).

NIGERIA: Over 150 records from Lagos beach and Bonny in the south to 50 m. from Maiduguri on the Fort Lamy road in the north 1955–58 (W. V. Harris, W. A. Sands and W. Wilkinson).

UGANDA: Bugondo, 1939 (P. R. Stephenson); Singo, Kalagala (Bulemezi), 1949 (W. V. Harris); Moroto (Karamoja), 1952 (W. A. Sands); 25 m. N. of Atura, 1955 (W. Wilkinson).

KENYA: Kisumu, 1952 (W. A. Sands).

SUDAN: Um Kheirein, 1927 (W. P. L. Cameron); Kadugli, 1952 (R. C. H. Sweeney).

ERITREA: Gula, 1953 (W. J. Stower).

This species has most commonly been collected from dead wood of all kinds, but its dark brown carton and earth mounds are also frequently encountered. It has often been recorded from the mounds of other genera of termites, particularly those of *Cubitermes*, *Trinervitermes*, *Odontotermes* and *Macrotermes*.

Amitermes hastatus (Haviland)

(Text-figs. 2C; 3C; 4D; 5C; 6C)

Termes hastatus Haviland, 1898, *J. Linn. Soc.* (*Zool.*) **26** : 358–442, South Africa : Cape Province; Port Elisabeth.

Hamitermes runconifer Silvestri, 1908, *Denkschr. med.-naturw. Ges. Jena*, **13** : 71–82.

Hamitermes (*Hamitermes*) *hastatus* (Haviland); Holmgren, 1912, *K. svenska Vetensk. Akad. Handl.* **48** (4) : 1–166.

Hamitermes hastatus var. *capicola* Silvestri, 1914, *Boll. Lab. zool. Portici*, **9** : 3–146.
Hamitermes atlanticus Fuller, 1922, *S. Afr. J. nat. Hist.* **3** (2) : 70–131.
Hamitermes capicola Silvestri ; Fuller, 1922, *ibid.*
Hamitermes gunni Fuller, 1922, *ibid.*
Hamitermes kellyi Fuller, 1922, *ibid.*
Hamitermes kenhardti Fuller, 1922, *ibid.*
Hamitermes libertatis Fuller, 1922, *ibid.*
Hamitermes londonensis Fuller, 1922, *ibid.*
Hamitermes murraysburgi Fuller, 1922, *ibid.*
Hamitermes schoombiensis Fuller, 1922, *ibid.*
Hamitermes zuurbergi Fuller, 1922, *ibid.*
Amitermes hastatus (Haviland) ; Sjöstedt, 1926, *K. svenska Vetensk. Akad. Handl.* (3) **3** (1) : 1–419.

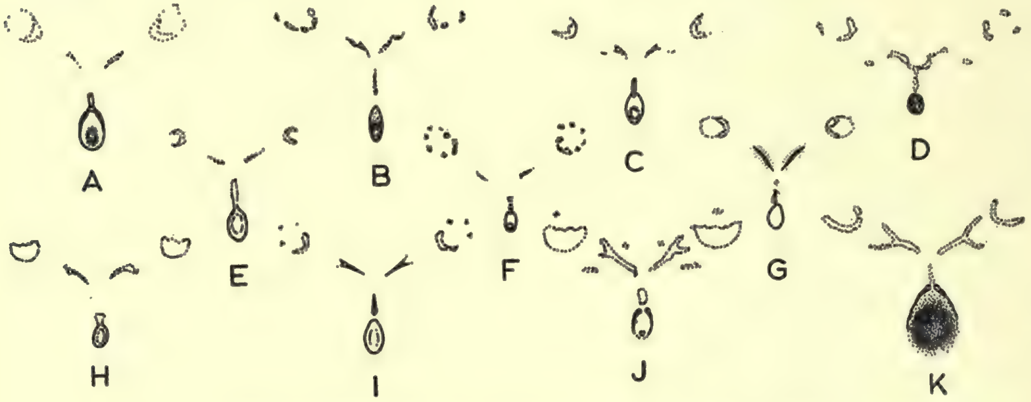

FIG. 3. Fontanelle and adjacent pattern of pale markings on frons of imagos.
A. *Amitermes braunsi* Fuller ; B. *Amitermes evuncifer* Silvestri ; C. *Amitermes hastatus* (Haviland) ; D. *Amitermes lönnbergianus* (Sjöstedt) ; E. *Amitermes messinae* Fuller ; F. *Amitermes somaliensis* Sjöstedt ; G. *Amitermes spinifer* Sllvestri ; H. *Amitermes stephensoni* Harris ; I. *Amitermes truncatidens* sp. nov.; J, K. *Amitermes unidentatus* (Wasmann).

Some additions to Haviland's description are necessary.

IMAGO. Antennae may have 14 or 15 segments. An increased range of size variation is now known.

	Range in mm.	Mean
Head width across eyes	0·95–1·16	1·05
Greatest diameter of eye	0·23–0·29	0·25
Ocellus	0·07–0·10 × 0·10–0·14	0·08 × 0·11
Ocellus to eye	0·03–0·08	0·06
Width of pronotum	0·76–1·04	0·89
Length of pronotum	0·44–0·64	0·54
Length of hind tibia	0·93–1·25	1·07
Length of fore wing	8·00–12·6	10·2

SOLDIER. Head capsule in plan view longer than broad, rounded rectangular to broadly ovoid, narrower at front. In profile, upper surface flat or only slightly curved between fold above fontanelle and even curvature to occiput. Antennae 13 to 15 segmented, proportions of basal segments variable. Anterior coxae without spines.

	Range in mm.	Mean
Length of head capsule	1·22–1·61	1·39
Greatest width of head	1·00–1·29	1·10
Width of head at base of mandibles	0·72–0·84	0·76
Depth of head	0·82–1·04	0·92
Length of left mandible	0·68–0·86	0·77
Length of pronotum	0·32–0·40	0·33
Width of pronotum	0·57–0·75	0·63
Length of hind tibia	0·80–1·14	0·94

WORKER. Third marginal tooth of left mandible not usually distinct from cutting edge separating it from first marginal. Anterior coxae without spines. These two characters enable the worker to be distinguished from all other species since the absence of coxal spines is usually associated with a distinct third marginal tooth.

The cotypes of all the species listed in the synonymy except *A. atlanticus* have been examined, and authentic material of the latter has been used. There is a continuous range of variation between the species, which are therefore all reduced to synonyms of *A. hastatus* (Hav.). There is, in fact, less variation in *A. hastatus* so constituted than occurs in the East African species *A. unidentatus* (Wasm.).

The only species likely to be confused with *A. hastatus* is the East and Central African *A. messinae* Fuller, from which it is easily distinguished in the alate by the straight or slightly sinuate anterior margin of the pronotum and in the soldier by the absence of anterior coxal spines. The alates from the more northerly and easterly localities appear to be slightly larger than those from the extreme south, but material is too limited to establish whether or not a cline exists.

SOUTH AFRICA: Port Elisabeth, and Simonstown, 1952 (W. V. Harris). Elgin Forest, 1954 (Balfour-Browne).

The majority of the records in the literature are from temperate or subtropical South Africa, the only exceptions being those of *A. runconifer* Silvestri from SW. Africa and the Kalahari Desert.

Amitermes importunus sp. nov.

(Text-figs. 4E; 5D; 6D)

IMAGO. Unknown.

SOLDIER. Head capsule pale yellow, sometimes a little darker towards front and sides; mandibles pale brown to chestnut brown, yellow-brown at base; antennae pale yellow, rest of body yellowish-white except where gut contents show through abdomen.

Head in plan view, distinctly longer than broad, sides straight to convex, parallel to distinctly convergent anteriorly; posterior margin regularly rounded or with rounded posterior corners distinct. In profile, upper surface of head straight or weakly sinuate between slight swelling above fontanelle and sharper curve to occiput. Mandibles slender, slightly more than half as long as head, strongly hooked ; tooth at or slightly behind middle, prominent, erect, triangular to obliquely truncated, sometimes somewhat rounded ; inner margin a regular curve from base of tooth to apex, or slightly straighter near apex. Antennae 14 segmented, II and V subequal and slightly longer than IV, III twice as long as IV. Head setae few in number.

Pronotum with anterior margin entire or weakly emarginate. Legs not markedly pubescent, anterior coxae without spines, though with one or two setae in same position.

	Range in mm.	Mean
Length of head capsule	1·04–1·61	1·42
Greatest width of head	0·90–1·16	1·08
Width of head at base of mandibles	0·75–0·89	0·82
Depth of head	0·77–1·00	0·91
Length of left mandible	0·68–0·86	0·77
Length of pronotum	0·32–0·43	0·39
Width of pronotum	0·61–0·75	0·69
Length of hind tibia	0·89–1·04	0·96

WORKER. Colour yellowish-white. Third marginal tooth of left mandible usually protrudes slightly beyond cutting edge connecting it with first marginal. Distance between points of apical and first marginal equal to, or greater than, distance between first and third marginals.

Described from numerous specimens from localities in Nyasaland and Northern Rhodesia.

Though somewhat similar to *A. evuncifer* and *A. truncatidens*, it can be distinguished by the straighter profile of the upper surface of the head, and in the worker by the different proportions of the teeth of the left mandible.

TYPE LOCALITY. NYASALAND : Central Province, 33 miles from Kasungu on the Lilongwe Rd., 18.ix.53 (W. A. Sands and W. Wilkinson, Coll. No. N. 470).

Holotype soldier and paratypes in British Museum (Natural History).

OTHER RECORDS

NYASALAND : Various localities from Lilongwe northwards, all in *Brachystegia* woodland, 1953 (W. A. Sands and W. Wilkinson).

NORTHERN RHODESIA : Abercorn, 1948 (P. E. Glover) ; near Tunduma, 1953 (W. A. Sands and W. Wilkinson) ; Ndola, Kafue River flood plain, Lake Bangweulu, 1957 (W. G. H. Coaton).

All the records are from the mounds of other genera, most commonly those of *Cubitermes*, but also from those of *Odontotermes* and *Macrotermes*. This entirely commensal habit distinguishes it from *A. truncatidens*, which occurs in the same localities, but is usually found in dead wood and in nests of its own construction.

A. importunus appears to occupy a similar ecological niche in the savannah woodland south of the Congo Rain Forest block to that of *A. stephensoni* in the essentially similar Guinean zone to the north.

Amitermes lonnbergianus (Sjöstedt)

(Text-figs. 2D; 3D; 4F; 5E; 6E)

Eutermes lönnbergianus Sjöstedt, 1911, *Ark. Zool.* **7** (18) : 1–3 Kenya : somewhat north of the Guaso Nyero.

Amitermes lönnbergianus (Sjöstedt) ; Sjöstedt, 1926, *K. svenska Vetensk. Akad. Handl.* (3) **3** (1) ; 1–419.

Amitermes lacertosus Ghidini, 1951, *Bol. Soc. ent. ital.* **73** : 30–34.

IMAGO. Previously undescribed.

Female, head dark chestnut brown. Area between eye and base of mandibles, and postclypeus, yellow-brown, the latter dusky in the middle. Labrum, antennae, ventral parts of thorax, legs, and abdominal sternites, yellow to yellow-brown, abdominal sternites sometimes darker laterally. Pronotum and abdominal tergites, dark chestnut brown. Meso- and metanota and pleura, brown.

Posterior margin of head almost semicircular ; fontanelle oval, often with small narrow extension anteriorly, smaller than ocelli, more or less depressed, centred slightly in front of a line joining posterior margins of eyes (the only E. African *Amitermes* in which this is the case) ; eyes about as long as postclypeus ; ocelli large, broad oval, separated from eyes by about their own width ; postclypeus

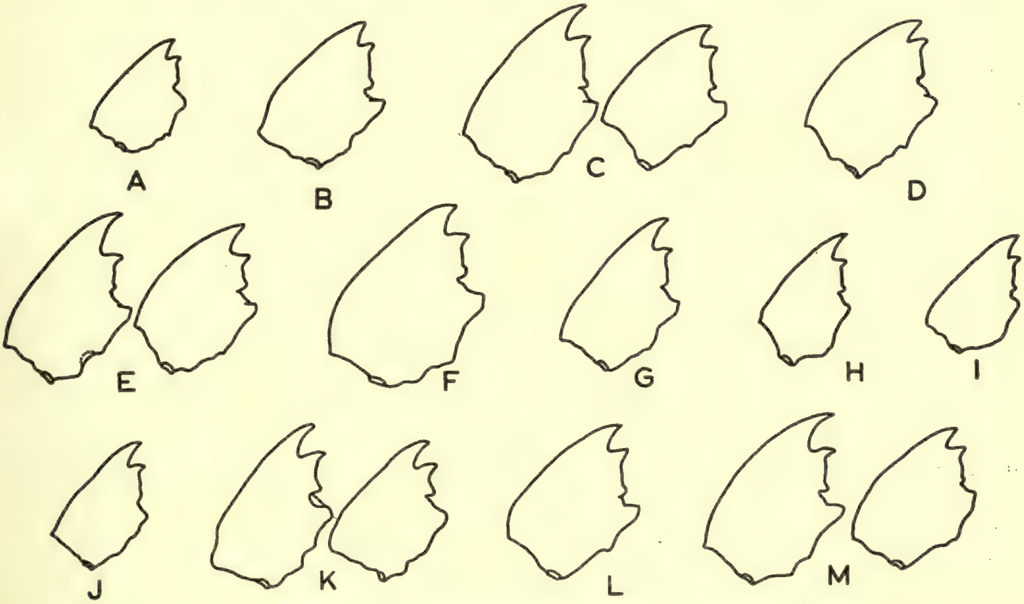

FIG. 4. Left mandibles of worker castes.

A. *Amitermes acinacifer* sp. nov.; B. *Amitermes braunsi* Fuller ; C. *Amitermes evuncifer* Silvestri ; D. *Amitermes hastatus* (Haviland) ; E. *Amitermes importunus* sp. nov.; F. *Amitermes lönnbergianus* (Sjöstedt) ; G. *Amitermes messinae* Fuller ; H. *Amitermes sciangallorum* Ghidini ; I. *Amitermes somaliensis* Sjöstedt ; J. *Amitermes spinifer* Silvestri ; K. *Amitermes stephensoni* Harris ; L. *Amitermes truncatidens* sp. nov.; M. *Amitermes unidentatus* (Wasmann).

about half as long as broad, inflated, anterior margin straight, posterior margin evenly convex; antennae 15 segmented, IV and V subequal, III half these, II slightly longer than III, shorter than IV and V; left mandible, third marginal tooth usually protrudes beyond the short cutting edge connecting it with first marginal apical tooth stout, slightly shorter or as long as first marginal.

Pronotum distinctly narrower than head across eyes, anterior margin straight, sides broadly rounded, converging to distinctly emarginate posterior.

Entire insect sparsely pubescent, intersegmental membrane of abdomen with shorter finer setae than rest of body.

Male, indistinguishable from female, apart from sexual characteristics.

	Range in mm.	Mean
Head width across eyes	1·18–1·25	1·21
Greatest diameter of eye	0·27–0·31	0·29
Ocellus	0·08–0·10×0·12–0·14	0·09×0·13
Ocellus to eye	0·08–0·11	0·09
Width of pronotum	0·93–1·02	0·98
Length of pronotum	0·61–0·64	0·62
Length of hind tibia	1·29–1·36	1·33

Described from five pairs of dealated males and females from the type locality.

MORPHOTYPE LOCALITY. KENYA: Lolokwi, north of the Uaso Nyero, 7.i.53 (W. A. Sands, Coll. No. 326). Morphotypes in British Museum (Natural History).

SOLDIER. Tooth of mandibles varies from vestigial to well developed, broadly triangular. Range of measurements much greater than previously recorded.

	Range in mm.	Mean
Length of head capsule	1·43–1·75	1·61
Greatest width of head	1·29–1·52	1·40
Width of head at base of mandibles	0·97–1·09	1·03
Depth of head	1·07–1·29	1·17
Length of left mandible	0·76–0·86	0·82
Length of pronotum	0·40–0·47	0·43
Width of pronotum	0·78–0·86	0·84
Length of hind tibia	1·18–1·39	1·30

The variation in the mandibular tooth of the soldier shows a tendency to form a cline, with the tooth most strongly developed in specimens from Marsabit in Northern Kenya. The cotype of *A. lacertosus* Ghidini corresponds exactly to the most northerly specimens of *A. lönnbergianus* (Sjöstedt) and the former species is therefore reduced to a synonym.

OTHER RECORDS. Only a representative selection is given.

KENYA: Turkana Province, Garamaroi, 1952; Northern Frontier Province, Marsabit, Isiolo, and near Garba Tula, 1953; Meru, Tana River (Grand Falls), 1953; Mtito Andei, 1952 (W. A. Sands); 40 m. from Hola on the Garissa Road, 1954 (W. Wilkinson); Malindi, Voi, 1950 (W. V. Harris).

TANGANYIKA: Mwakijembe, Same, 1952 (P. B. Kemp); Sanya Plain, 1951 (R. C. H. Sweeney).

SOMALILAND : Burao, 1952 (E. J. Van Ingen).

This species is common in dead wood and dung in these localities, but has only once been recorded from a low mound. The nest is probably usually subterranean. There are a few records from mounds of *Cubitermes* spp., but this is a rare occurrence.

Amitermes messinae Fuller

(Text-figs. 2, E, F ; 3E ; 4G ; 5F ; 6, F, M)

Hamitermes messinae Fuller, 1922, *S. Afr. J. nat. Hist.* **3** (2) : 70–131, South Africa : Northern Transvaal, Messina.

Eutermes hastatus (Haviland) ; Sjöstedt, 1910, *Wiss. Ergeb. Schwed. Zool. Expedn., Kilimandjaro-Meru,* 1905–1906, **3** (15) : 1–28, Tanganyika : Kibonoto.

Amitermes sp. I., Kemp, 1955, *Bull. ent. Res.* **38** : 125.

Amitermes harleyi Harris, 1957, *B.M.N.H. Rept. Exp. S.W. Arabia,* 1421–433.

IMAGO. *Female,* head and pronotum dark sepia brown, postclypeus only slightly paler, brown. Antennae pale brown, apices of segments yellowish-white. Labrum pale yellow. Thoracic sclerites (apart from pronotum), abdominal tergites and lateral parts of sternites sepia brown. Legs, femora pale, tibiae dusky at base, paler distally, tarsi pale, yellowish-white. Middle of abdominal sternites yellowish-white. Wings translucent pale brown, venation entirely sepia brown.

Posterior margin of head almost semicircular ; fontanelle pale, broad oval, approximately equal in size to ocelli, slightly depressed, with narrow parallel-sided pale extension from anterior end, almost as long as rest of fontanelle ; eyes as long as or slightly shorter than postclypeus ; ocelli of medium size, separated from eyes by slightly more than own width ; postclypeus inflated, length about half breadth, posterior margin convex, arched in middle, straighter laterally, anterior margin straight ; antennae 15 segmented, III half as long as II, IV and V subequal, shorter than II, longer than III.

Pronotum distinctly narrower than head across eyes, anterior margin produced into a short but distinct emarginate median lobe, sides broadly rounded, converging to slightly emarginate posterior.

Entire insect finely pubescent, with pale setae, those of intersegmental membrane of abdomen shorter, curved, yellow.

Male, closely similar to female except that wings often slightly smaller.

	Range in mm.	Mean
Head width across eyes	0·87–1·02 .	0·99
Greatest diameter of eye	0·21–0·26 .	0·24
Ocellus	0·06–0·07 × 0·09–0·10 .	0·07 × 0·09
Ocellus to eye	0·07–0·08 .	0·07
Width of pronotum	0·72–0·86 .	0·80
Length of pronotum	0·47–0·57 .	0·53
Length of hind tibia	0·89–1·04 .	1·01
Length of fore wing.	8·80–10·50 .	9·60

SOLDIER. Head capsule mainly pale yellow, sometimes darker, yellow- to red-

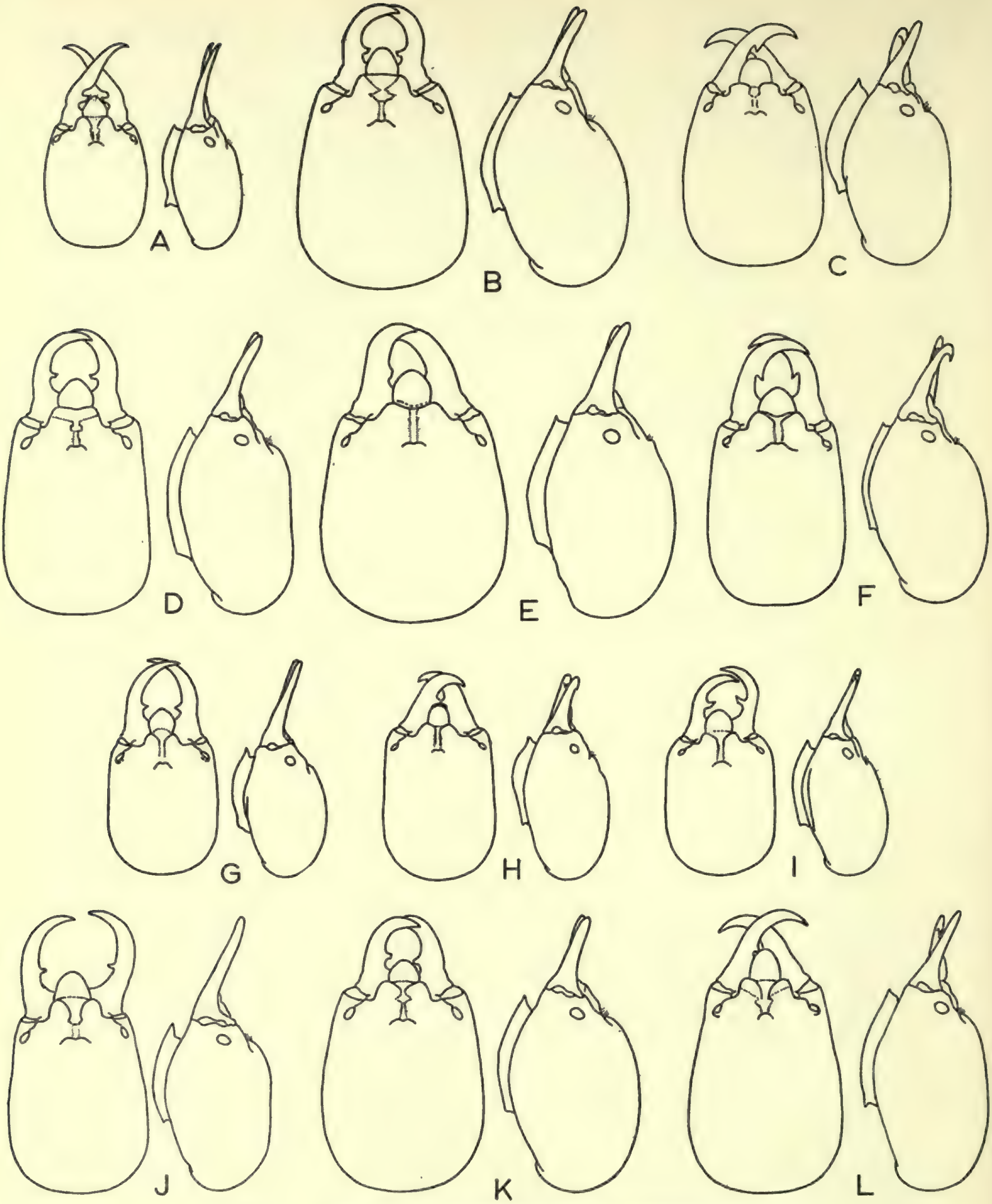

FIG. 5. Plan and side views of heads of soldier castes.

A. *Amitermes acinacifer* sp. nov.; B. *Amitermes evuncifer* Silvestri ; C. *Amitermes hastatus* (Haviland) ; D. *Amitermes importunus* sp. nov ; E. *Amitermes lönnbergianus* (Sjöstedt) ; F. *Amitermes messinae* Fuller ; G. *Amitermes sciangallorum* Ghidini ; H. *Amitermes somaliensis* Sjöstedt ; I. *Amitermes spinifer* Silvestri ; J. *Amitermes stephensoni* Harris ; K. *Amitermes truncatidens* sp. nov.; L. *Amitermes unidentatus* (Wasmann).

brown at sides and in front of fontanelle ; mandibles yellow-brown to deep red-brown. Antennae, pronotum and legs, yellow, pronotum sometimes slightly darker in front ; rest of body yellowish-white except where gut contents show through abdomen.

Head capsule in plan view distinctly longer than broad, variable in outline, approximating to rounded rectangular, posterior margin sometimes evenly rounded. In profile, continuously curved from fontanelle to occiput, curve shallower in front. Mandibles rather more than half as long as head, slender, strongly hooked ; tooth approximately in middle, backwardly directed in a continuous line with the inner margin anterior to it, not prominent ; inner margin a regular curve from tooth to apex inclusive. Antennae normally 14 segmented, II equals III and IV together, V longer than III and IV, shorter than II. Head capsule with scattered rather long setae, more numerous near fontanelle.

Pronotum, anterior margin entire or slightly emarginate. Legs sparsely pubescent ; anterior coxae with one to four spines grouped in the middle of the front surface.

	Range in mm.	Mean
Length of head capsule . . .	1·02–1·55 .	1·30
Greatest width of head . . .	0·78–1·18 .	0·96
Width of head at base of mandibles .	0·64–0·89 .	0·79
Depth of head	0·68–1·00 .	0·84
Length of left mandible . . .	0·65–0·86 .	0·80
Length of pronotum . . .	0·32–0·43 .	0·39
Width of pronotum . . .	0·54–0·74 .	0·64
Length of hind tibia . . .	0·68–0·93 .	0·82

WORKER. Colour yellowish-white. Third marginal tooth of left mandible not distinct from cutting edge connecting it to first marginal. Spines present on anterior coxae as in soldier. This character enables its separation from *A. unidentatus*, these two species being the commonest in many localities. Workers of *A. acinacifer*, *A. acutidens* and *A. curvatus*, which have similar coxal spines, are usually smaller.

Specimens from all parts of East Africa have been compared with the holotype male and morphotype soldier from Messina. East African alates are very slightly larger than the type, but agreement is complete in both castes in all other respects. The characteristic shape of the anterior margin of the alate pronotum has not been found in any other Ethiopian species including *A. hastatus* (Hav.) of which the soldier is somewhat similar. *A. harleyi* Harris agrees closely with specimens of *A. messinae* from Northern Kenya, and is therefore reduced to a synonym.

A representative selection is given of the records available for this species.

KENYA : Magadi, Nairobi, Voi, 1950 (W. V. Harris) ; Donyo Sapuk, 1952, Marsabit,, Meru-Tharaka Rd., 1953 (W. A. Sands).

TANGANYIKA : Maswa, 1928 (W. V. Harris) ; Mwakijembe, Korogwe, Handeni, Arusha-Moshi Rd., 1951 ; Kihurio, Same, Mgera, 1952 (P. B. Kemp).

NYASALAND : Lower Shire, 17 miles north of Port Herald, Bilila near Fort Johnstone, Mpatamanga Gorge, 1953 (W. A. Sands and W. Wilkinson).

ZANZIBAR : Paje, Ras Fumba, 1951 (W. V. Harris).

ADEN: Western Aden Protectorate, Abyan in the Wadi Bana near Ga'ar, and Al Sura, south of Mudia, 1951 (W. V. Harris).

This species has been recorded from dead wood, dung, and on several occasions from the nests of other termites, particularly those of *Macrotermes* spp.

The type locality, Messina on the Limpopo River, must be near the southern limit of the range, since this is an East African species.

Amitermes sciangallorum Ghidini

(Text-figs. 4H; 5G; 6G)

Amitermes sciangallorum Ghidini, 1941, *Bol. Soc. ent. ital.* **73** (2): 30–34, Ethiopia: Murle:
Amitermes sp. II (part) Kemp, 1955, *Bull. ent. Res.* **38**: 125.

IMAGO. Unknown.

SOLDIER. The following additions to Ghidini's description are necessary. Head capsule in profile, continuously curved from fontanelle to occiput, top of head evenly curved. Mandibles slender, evenly and lightly curved from near base to apex; tooth distinctly behind middle, prominent, erect, equilaterally triangular; inner margin a regular curve from base of tooth to apex, or slightly shallower near base of tooth. Antennae 14 segmented, III and IV subequal, shorter than V; II as long as III and IV combined. Head capsule with scattered setae.

Pronotum with anterior border entire or slightly emarginate, anterior lobe large. Anterior coxae with 3–5 spines grouped on front surface. Rest of legs with setae and tibial spurs.

	Range in mm.	Mean
Length of head capsule	1·04–1·07	1·05
Greatest width of head	0·84–0·88	0·86
Width of head at base of mandibles	0·68–0·72	0·70
Depth of head	0·68–0·72	0·72
Length of left mandible	0·72–0·78	0·75
Length of pronotum	0·36	
Width of pronotum	0·54	
Length of hind tibia	0·70–0·75	0·73

WORKER. Colour yellowish-white. Postclypeus slightly more swollen than in *A. spinifer* Silvestri. Third marginal tooth of left mandible usually protrudes slightly beyond cutting edge connecting it with first marginal.

The soldier resembles *A. spinifer* in size and colour, but the mandibles are distinct. The head profile is similar to *A. acinacifer*, to which it is probably related.

TANGANYIKA: Kumburu, Mwakijembe, Ngomeni, 1951; Kihurio, Mnazi, 1952 (P. B. Kemp).

Three of the four records are from dead logs and stumps, the fourth from a mound with *Trinervitermes* sp. and two other species of *Amitermes*.

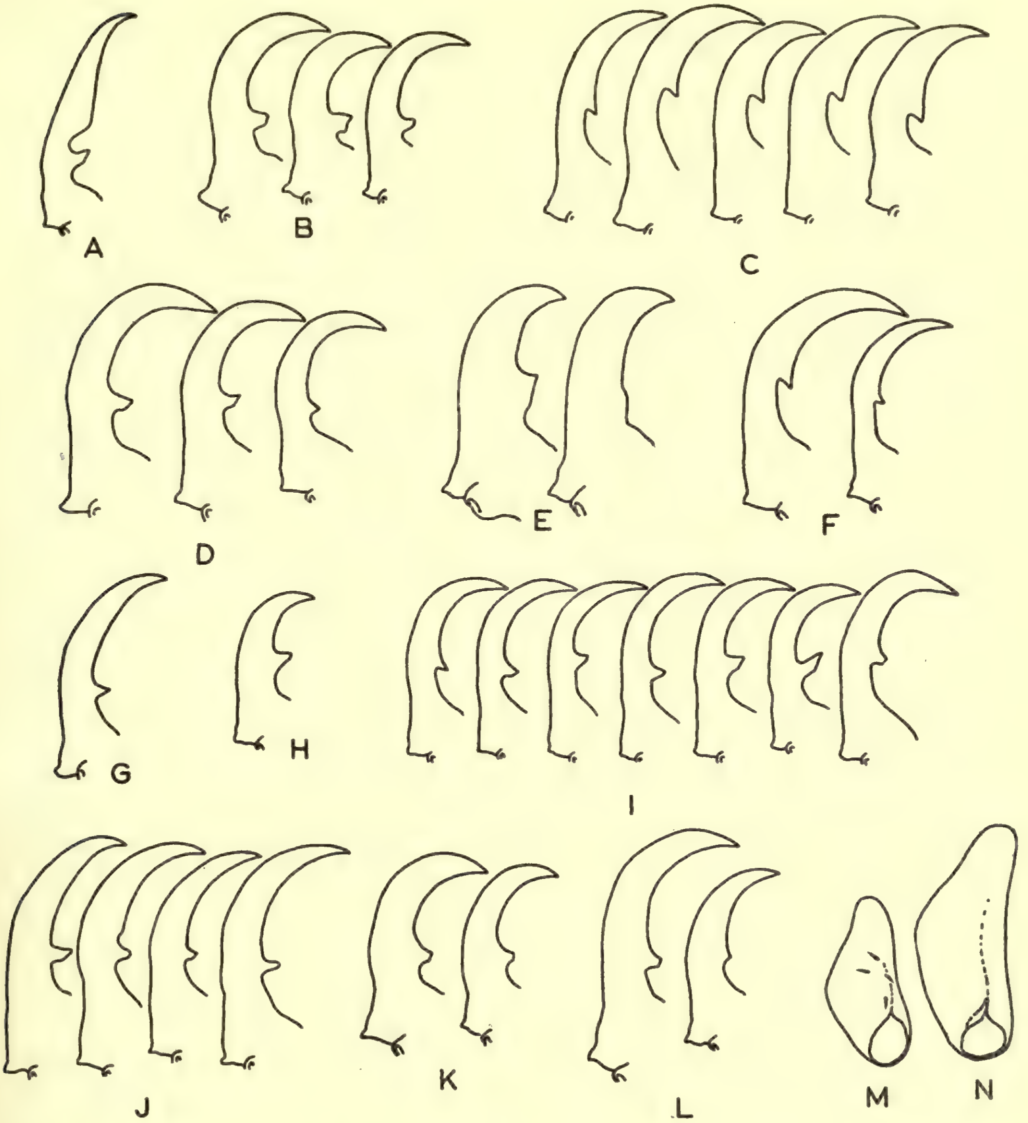

FIG. 6. A–L, left mandibles of soldier castes showing range of variation ; M, N, anterior coxae of soldier caste showing presence and absence of coxal spines.

A. *Amitermes acinacifer* sp. nov.; B. *Amitermes evuncifer* Silvestri ; C. *Amitermes hastatus* (Haviland) ; D. *Amitermes importunus* sp. nov.; E. *Amitermes lönnbergianus* (Sjöstedt) ; F, M. *Amitermes messinae* Fuller ; G. *Amitermes sciangallorum* Ghidini ; H. *Amitermes somaliensis* Sjöstedt ; I. *Amitermes spinifer* Silvestri ; J. *Amitermes stephensoni* Harris ; K. *Amitermes truncatidens* sp. nov.; L, N. *Amitermes unidentatus* (Wasmann).

Amitermes somaliensis Sjöstedt

(Text-figs. 2G; 3F; 4I; 5H; 6H)

Amitermes somaliensis Sjöstedt, 1927, *Rev. zool. afric.* **15** : 97–104, Somaliland : Villagio Duca Abruzzi.

IMAGO. Previously undescribed.

Female, head and pronotum sepia-brown, postclypeus paler, yellow-brown. Antennae pale yellow-brown, labrum pale yellow. Thoracic sclerites, pronotum, excepted, legs, and small patches at lateral margins of abdominal sternites, pale yellow-brown, rest of abdominal sternites yellowish-white. Abdominal tergites pale sepia brown. Wings translucent pale brown, subcosta and radius sector largely pale yellow, radius sector sepia brown at base with narrow sepia brown streak running parallel to and touching posterior edge, throughout its length. Rest of venation brown.

Posterior margin of head almost semicircular; fontanelle pale, broad oval to almost circular, slightly smaller than ocelli, weakly depressed; eyes as long as postclypeus; ocelli small, separated from eyes by own width or slightly less; postclypeus weakly inflated, length rather more than half breadth, posterior margin evenly convex, anterior margin straight; left mandible with third marginal tooth distinctly protruding beyond sinuate cutting edge joining it to first marginal, apical equal in length to first marginal; antennae 15 segmented, II equal to III and IV together, V longer than these but shorter than II.

Pronotum narrower than head across eyes, anterior margin straight, sides broadly rounded, converging to slightly emarginate posterior.

Pubescence of sclerites pale, fine, rather sparse and scattered, that of intersegmental membrane of abdomen shorter, curved, evenly distributed, yellowish.

Male, as female, except wings slightly shorter.

	Range in mm.	Mean
Head width across eyes	0·86–0·93	0·89
Greatest diameter of eye	0·21–0·23	0·22
Ocellus	0·07–0·08 × 0·08–0·10	0·07 × 0·09
Ocellus to eye	0·04–0·08	0·05
Width of pronotum	0·68–0·75	0·73
Length of pronotum	0·43–0·50	0·46
Length of hind tibia	0·82–0·89	0·85
Length of fore wing	8·20–8·90	8·60

Described from two collections containing many alates from Marsabit, Northern Kenya.

MORPHOTYPE LOCALITY. KENYA: Marsabit, Northern Frontier Province, 10.iii.53 (W. A. Sands, Coll. No. 486). Morphotypes in British Museum (Natural History).

SOLDIER. A greater range of size variation than that recorded by Sjöstedt is now known. Anterior coxae with 2–3 small spines.

	Range in mm.	Mean
Length of head capsule	1·06–1·18	1·16
Greatest width of head	0·78–0·86	0·81
Width of head at base of mandibles	0·66–0·72	0·70
Depth of head	0·68–0·72	0·71
Length of left mandible	0·57–0·65	0·58
Length of pronotum	0·32	
Width of pronotum	0·52–0·54	0·53
Length of hind tibia	0·68–0·70	0·68

All the specimens correspond exactly with Sjöstedt's description of this species.

KENYA: Northern Frontier Province, Marsabit, 1953 (W. A. Sands).

Five samples were collected in this area, from the surface layers of mounds of *Macrotermes bellicosus* (Smeathman). This habitat agrees with the original record, and confirms the identity of the specimens. One soldier apparently of this species is recorded from southern Nyasaland, but it cannot be definitely identified in view of the discontinuity of the distribution involved.

Amitermes spinifer Silvestri

(Text-figs. 2H; 3G; 4J; 5I; 6I)

Hamitermes spinifer Silvestri, 1914, *Boll. Lab. zool. Portici* **9**: 3–146, Senegal: Dakar, Thiès.
Amitermes sp. II (part) Kemp, 1955, *Bull. ent. Res.* **38**: 125.

IMAGO. Previously undescribed.

Female, head and pronotum dark sepia brown, postclypeus paler, yellow-brown. Antennae brown, apices of segments yellowish-white. Labrum yellow. Meso- and metanota yellow, other thoracic sclerites yellow-brown. Abdominal tergites and lateral parts of sternites, sepia brown. Legs, femora yellow, tibiae yellow-brown at base, paler distally, tarsi yellow. Middle parts of abdominal sternites yellowish-white. Wings translucent, brown, venation sepia brown.

Posterior margin of head almost semicircular; fontanelle smaller than ocelli, very slightly depressed, with very small pale extension from anterior and between two short diverging shallow grooves; eyes distinctly longer than postclypeus; ocelli of medium size, separated from eyes by about half own width; postclypeus inflated, length about half breadth or slightly less, posterior margin convex, arched in middle, straighter laterally, anterior margin straight or slightly concave; antennae 15 segmented, III half as long as II, IV and V subequal, shorter than II, longer than III.

Pronotum distinctly narrower than head across eyes, anterior margin straight or slightly sinuate, sides broadly rounded, converging to very weakly emarginate posterior.

Pubescence of sclerites pale, that of intersegmental membrane of abdomen curved, yellowish.

Male, as female, except posterior abdominal sternites uniformly brown, intersegmental pubescence of abdomen sparser, wings very slightly shorter.

	Range in mm.	Mean
Head width across eyes	0·89–0·91	0·90
Greatest diameter of eye	0·22–0·23	0·23
Ocellus	0·07–0·09 × 0·10–0·13	0·08 × 0·11
Ocellus to eye	0·02–0·04	0·03
Width of pronotum	0·68–0·77	0·72
Length of pronotum	0·43–0·47	0·44
Length of hind tibia	0·82–0·93	0·89
Length of fore wing	7·7–8·1	8·0

Described from two series of alates and a separate queen from different localities in Nigeria.

MORPHOTYPE LOCALITY. NIGERIA: Northern Region, 30 miles from Lokoja on the Okene road, in mound of *Cubitermes* sp., 8.iii.58 (W. A. Sands, Coll. No. 2092). Morphotypes in British Museum (Natural History).

SOLDIER. The following data and measurements must be added to Silvestri's description. Tooth of mandible highly variable, from backwardly directed in a continuous line with the inner margin anterior to it, to prominent, erect, directed slightly forwards, obliquely truncated and sharply pointed; inner margin a regular curve from base of tooth to apex.

	Range in mm.	Mean
Length of head capsule	0·89–1·18	1·03
Greatest width of head	0·74–0·91	0·83
Width of head at base of mandibles	0·58–0·68	0·64
Depth of head	0·61–0·72	0·65
Length of left mandible	0·61–0·72	0·65
Length of pronotum	0·29–0·32	0·30
Width of pronotum	0·47–0·54	0·50
Length of hind tibia	0·68–0·75	0·71

WORKER. Postclypeus flatter than in *A. acinacifer*. Third marginal tooth of left mandible not distinct from cutting edge connecting it with first marginal.

The soldier mandibles of *A. spinifer* are the most variable of any African species, the range having been established from a large amount of material from East and West Africa. The type specimens have been examined and compared with similar series from Nigeria. They fall near to but not at the extreme of reduction of the mandibular tooth.

OTHER RECORDS

SIERRA LEONE: Freetown, 1958 (W. Wilkinson).

NIGERIA: 12 m. from Tula on Numan Road, Yola, Zinna, 22 m. from Beli on Jalingo Road, Samaru, 1957; and 20 m. from Yandev on Makurdi Road, 1958 (W. A. Sands).

UGANDA: Moroto, and 40 m. from Moroto on Soroti Road, 1952 (W. A. Sands).

KENYA: Kinango, Kwale, 1952 (P. B. Kemp), between Tharka and Meru, 1953 (W. A. Sands).

TANGANYIKA: Kumburu-Ngomeni, 1951 (P. B. Kemp).

This small species has been collected from the mounds of other genera, mainly those of *Cubitermes*, but has rarely been found in dead wood.

Its distribution in Kenya and Tanganyika appears to be restricted to small areas of suitable savannah on the lower slopes of mountains or hills.

Amitermes stephensoni Harris

(Text-figs. 2I ; 3H ; 4K ; 5J ; 6J)

Amitermes stephensoni Harris, 1957, *B.M.N.H. Rept. Exp. S.W. Arabia :* 421–433, Eastern Aden Protectorate, Saiun in the Hadhramaut.

IMAGO. Previously undescribed.

Female, head and pronotum dark sepia brown, postclypeus only slightly paler, yellow-brown. Antennae pale brown, apices of segments yellowish-white. Labrum yellow-brown. Thoracic sclerites apart from pronotum, abdominal tergites and lateral parts of sternites sepia brown. Legs, femora yellow-brown, tibiae brown, paler at tips, tarsi, including claws, yellow-brown. Middle parts of abdominal sternites pale yellow to yellow-brown, posterior segments sometimes uniformly brown. Wings, translucent, brown, venation mainly sepia brown, subcosta with paler streak along posterior edge, more noticeable towards wing tip.

Posterior margin of head broadly rounded, not almost semicircular as in the other species, usually slightly sinuate immediately behind eyes ; fontanelle pale, broad oval, half as large as ocelli or less, with small parallel-sided pale extension from anterior end ; eyes as long as postclypeus ; ocelli of medium size, separated from eyes by slightly less than own width ; postclypeus inflated, length about half width or slightly more, posterior margin evenly convex, anterior margin straight ; left mandible with third marginal tooth not distinct from cutting edge connecting it to first marginal; antennae 15 segmented, II equal to III and IV together, IV and V subequal, slightly longer than III.

Pronotum narrower than head across eyes, anterior margin straight, sides broadly rounded, converging to emarginate posterior.

Pubescence of sclerites fine, pale, rather sparse and scattered, that of intersegmental membrane of abdomen very short, fine and pale.

Male, as female, except posterior abdominal sternites uniformly brown, wings slightly shorter.

	Range in mm.	Mean
Head width across eyes	1·00–1·11	1·06
Greatest diameter of eye	0·24–0·29	0·27
Ocellus	0·08–0·09×0·11–0·13	0·08×0·12
Ocellus to eye	0·04–0·08	0·07
Width of pronotum	0·82–0·97	0·91
Length of pronotum	0·54–0·64	0·60
Length of hind tibia	0·97–1·13	1·05
Length of fore wing	9·80–10·0	9·40

Described from numerous specimens from Nigeria.

MORPHOTYPE LOCALITY. NIGERIA: Northern Region, 43 m. from Maiduguri on the Potiskum road, 31.v.57 (W. A. Sands Coll. No. S.1615). Morphotypes in British Museum (Natural History).

SOLDIER. The new material of this species has necessitated some additions to Harris's description.

Head capsule mainly pale yellow sometimes yellow-brown to brown at sides and in front of fontanelle.

Head profile with upper surface straight or slightly curved between swelling above fontanelle and sharper curve to occiput. Mandibles over half as long as head, relative width in front of and behind tooth variable; tooth at or slightly behind middle, prominent and erect, obliquely truncated, triangular or rounded; inner margin usually a continuous curve from base of tooth to apex, sometimes slightly sinuate near tooth.

Anterior coxae with at least one spine on front surface, often two or three.

	Range in mm.	Mean
Length of head capsule	1·11–1·39	1·28
Greatest width of head	0·96–1·17	1·11
Width of head at base of mandibles	0·72–0·84	0·78
Depth of head	0·80–0·91	0·87
Length of left mandible	0·72–0·95	0·86
Length of pronotum	0·32–0·46	0·40
Width of pronotum	0·57–0·77	0·68
Length of hind tibia	0·72–1·09	0·89

WORKER. Left mandible similar to that of imago, except that the cutting edge between first and third marginals is sometimes slightly more concave. Spines are present on anterior coxae.

These characters distinguish it from *A. evuncifer* which often occurs in similar situations.

Though the type locality for this species is Aden, this must be the extreme eastward end of its range, since it occurs in the Guinean and Sudan vegetation zones in Nigeria.

OTHER RECORDS. Only a representative selection is given.

NIGERIA: Western Region, between Shagamu and Ijebu-Ode, 1957; Northern Region, Kaura Namoda, 1956; 10 m. North of Bida, Tula, Yola, 19 m. South of Beli, 22 m. from Lokoja on Kabba Road, 32 m. from Damaturu on Potiskum Road, 1957 and 1958 (W. A. Sands).

This species has only rarely been taken from dead wood; in most cases it has been collected from the mounds built by other species or genera, mainly those of *Macrotermes* and *Trinervitermes* spp., but not uncommonly in *Odontotermes* and *Cubitermes* mounds.

Amitermes truncatidens sp. nov.

(Text-figs. 2J ; 3I ; 4L ; 5K ; 6K)

Amitermes limpopoensis Fuller ; Harris, 1958, *Explor. Parc. nat. Upemba Miss. de Witte,* **52** (1) : 1–26.

IMAGO. *Female,* head and pronotum mainly sepia brown. Postclypeus and a somewhat diffuse streak from posterior margin of eye to back of head, paler, yellow-brown. Labrum, antennae, ventral parts of thorax, femora, tarsi and median parts of abdominal sternites, pale yellow. Lateral parts of thorax, tibiae and lateral parts of abdominal sternites, pale yellow-brown. Meso- and metanota and abdominal tergites, brown.

Posterior margin of head almost semicircular, fontanelle oval, with small narrow pale extension anteriorly, slightly depressed ; frons with two small pale grooves diverging from near ventral end of fontanelle extension ; eyes about as long as postclypeus ; ocelli of medium size, separated from eyes by slightly less than own width ; postclypeus about half as long as broad, inflated, anterior margin straight, posterior margin evenly convex ; antennae 15 segmented, IV and V subequal, III shorter, II longer than these ; left mandible, third marginal tooth protrudes beyond cutting edge connecting it with first marginal.

Pronotum narrower than head across eyes, anterior margin straight, sides slightly sinuate, converging to distinctly emarginate posterior.

Entire insect finely pubescent, setae of intersegmental membrane shorter than others.

Male, as female.

	Range in mm.	Mean
Head width across eyes	1·07	—
Greatest diameter of eye	0·29–0·30	0·29
Ocellus	0·08–0·09×0·12–0·13	0·09×0·13
Ocellus to eye	0·05–0·07	0·07
Width of pronotum	0·89	—
Length of pronotum	0·50	—
Length of hind tibia	1·07–1·13	1·09
Length of fore wing	9·50–10·0	9·67

SOLDIER. Head capsule pale yellow ; mandibles yellow-brown at base, chestnut-brown at tips ; antennae pale yellow, rest of body yellowish-white except where gut contents show through abdomen.

Head in plan view distinctly longer than broad, sides convex, converging slightly anteriorly ; posterior margin evenly rounded or nearly so. In profile, continuously curved from fontanelle to occiput, curve shallower in front. Mandibles slightly less than half as long as head, rather stout, strongly hooked ; tooth slightly behind middle, prominent, erect, transversely to obliquely truncated ; inner margin a regular curve from base of tooth to apex. Antennae 14–15 segmented, proportions of basal segments variable, II longer than III, IV or V. Head capsule almost devoid of setae except surrounding fontanelle.

Pronotum, anterior margin entire or slightly emarginate. Legs almost without setae or spines except at distal ends of tibiae and tarsi ; anterior coxae without spines or setae.

	Range in mm.	Mean
Length of head capsule	1·33–1·61	1·50
Greatest width of head	1·07–1·30	1·20
Width of head at base of mandibles	0·78–0·90	0·83
Depth of head	0·91–1·12	1·03
Length of left mandible	0·64–0·74	0·70
Length of pronotum	0·32–0·40	0·36
Width of pronotum	0·62–0·72	0·67
Length of hind tibia	0·89–1·04	0·97

WORKER. Indistinguishable from *A. evuncifer* Silv.

A. truncatidens closely resembles *A. evuncifer* in all castes, and may ultimately prove to be a southern race of that species. In the present absence of intermediate forms it can be distinguished in the alate caste by the broader oval fontanelle, and the shallow diverging pale grooves on the frons. The soldier head capsule is more inflated above the fontanelle, and the mandibular tooth is usually more transversely truncated.

Described from 22 alates and numerous soldiers from the type colony, and many soldiers from other localities.

TYPE LOCALITY. TANGANYIKA : Nachingwea, 22.x.50 (W. V. Harris, Coll. No. 756).

Holotype female, allotype male, morphotype soldier and paratypes in British Museum (Natural History).

OTHER RECORDS. A representative selection is given.

NYASALAND : Near Mpatamanga Gorge, Kasungu, 60 m. from Mzimba on Rumpi Road, Songwe River, 1953 (W. A. Sands and W. Wilkinson).

NORTHERN RHODESIA : Choma : Siamambo, near Kitwe, Lake Bangweulu, Lusaka, 1957 (W. G. H. Coaton), Barotseland, 1956 (E. N. Cooling).

SOUTHERN RHODESIA : Salisbury, 1911 (G. A. K. Marshall).

ANGOLA : Munhango, 1928 (M. Burr).

This species is common in dead wood, and in carton nests of its own construction, but has also been recorded from the mounds of various Macrotermitinae.

Amitermes unidentatus (Wasmann)

(Text-figs. 2K ; 3, J, K ; 4M ; 5L ; 6, L, N)

Termes unidentatus Wasmann, 1897, *Abh. Senckenb. Ges.* **21** : 137–182, Bawi Island Zanzibar.

Hamitermes (" *Termes* ") *unidentatus* (Wasmann) ; Wasmann, 1910, *Voeltzkow, Reise Ostafrika,* **3** : 117–127.

Eutermes meruensis Sjöstedt, 1911, *Ent. Tidskr.* **32** : 173–188.

Hamitermes (*Hamitermes*) *meruensis* (Sjöstedt) ; Holmgren, 1912, *K. svenska Vetensk. Akad. Handl.* **48** (4) : 1–166.

Hamitermes elongatus Silvestri, 1914, *Boll. Lab. zool. Portici,* **9** : 3–146.

Hamitermes limpopoensis Fuller, 1922, *S. Afr. J. nat. Hist.* **3** (2) : 70–131.

Amitermes unidentatus (Wasmann); Sjöstedt, 1926, *K. svenska Vetensk. Akad. Handl.* (3) **3** (1): 1–419, and also *Rev. zool. africaine*, **14** (1): 141–164.

Amitermes (*Amitermes*) *elongatus* Silvestri: Emerson, 1928, *Bull. Amer. Mus. nat. Hist.* **57**: 401–574.

Amitermes macrocephalus Ghidini, 1941, *Bol. Soc. ent. ital.* **73**: 30–34.

IMAGO. Some additions to Sjöstedt's description are necessary.

Fontanelle, larger than ocelli, variable, flat to deeply depressed, sometimes very large, more than half diameter of eye; postclypeus inflated, posterior margin convex, slightly sinuate laterally, anterior margin straight; left mandible with third marginal tooth distinct, distance between apical and first marginal usually less than that between first and third marginals; antennae 14–15 segmented.

	Range in mm.	Mean
Head width across eyes	1·04–1·22	1·12
Greatest diameter of eye	0·26–0·32	0·30
Ocellus	0·07–0·09 × 0·09–0·13	0·08 × 0·10
Ocellus to eye	0·05–0·09	0·07
Width of pronotum	0·86–1·11	0·98
Length of pronotum	0·56–0·75	0·65
Length of hind tibia	1·04–1·33	1·20
Length of fore wing	8·40–12·0	10·1

SOLDIER. Highly variable in shape and proportions of head capsule and mandibles. In plan view, head usually approximates to rectangular; in profile, continuously curved from fontanelle to occiput, curve shallower in front. Tooth of soldier mandible varies from prominent to vestigial. Anterior coxal spines absent in both soldier and worker.

	Range in mm.	Mean
Length of head capsule	1·13–1·79	1·55
Greatest width of head	0·96–1·39	1·17
Width of head at base of mandibles	0·72–0·93	0·84
Depth of head	0·75–1·11	0·96
Length of left mandible	0·66–0·90	0·81
Length of pronotum	0·32–0·47	0·39
Width of pronotum	0·57–0·84	0·73
Length of hind tibia	0·87–1·14	1·03

The cotypes of *A. elongatus* Silvestri, *A. limpopoensis* Fuller, and *A. macrocephalus* Ghidini have been examined, together with topotypes of *A. meruensis* (Sjöstedt) and a large quantity of material of *A. unidentatus* (Wasm.) including topotypes. They form a continuous range of variation, and therefore *A. elongatus* Silv., *A. limpopoensis* Fuller, *A. meruensis* (Sjöst.) and *A. macrocephalus* Ghidini must be reduced to synonyms of *A. unidentatus* (Wasm.). Sjöstedt's record of *A. unidentatus* from the Gold Coast (*Ark. Zool.* **18** (12): 1–5) would appear to be anomalous in view of the known distribution of the species. The specimens have not been examined and cannot therefore be assigned to the correct species, but it has been disregarded in preparing the map of distribution of the genus.

This species is distinguished from *A. truncatidens* sp. nov., *A. evuncifer* Silvestri, and *A. importunus* sp. nov. by the less prominent tooth of the soldier mandible; from *A. messinae* Fuller and *A. spinifer* Silvestri by the absence of spines from the anterior coxae, in both soldier and worker castes.

A representative selection from the large number of records of this species is given.

UGANDA: Toror Hills, Karamoja District, 1952 (W. A. Sands).

KENYA: Malindi, Samburu, Shimba Hills, 1950, Voi, 1952 (W. V. Harris); Ol Donyo Sapuk, Ngong Hills, 1952, Marsabit, Lolokwi, Uaso Nyero, Isiolo, Tharaka-Meru, 1953 (W. A. Sands).

TANGANYIKA: Kirando, 1933; Uvinza, 1934; Mafia Is., 1937; Ngare Nanyuki (topotypes of *A. meruensis* (Sjöst.)), Bomangombe, 1950 (W. V. Harris). Shinyanga, Tabora, 1948; Itigi, Singida, 1949; Babati, Tanga, 1950; Amani, 1951; Sama, Handeni, Mwakijembe, 1952 (P. B. Kemp).

ZANZIBAR: Bawi Is. (topotypes of *A. unidentatus* (Wasm.)), Mangapwani, 1951 (W. V. Harris).

RUANDA URUNDI: Nshiri-Kibungu, 1952 (W. V. Harris).

NYASALAND: Localities from Salima southwards to Chiromo, 1953 (W. A. Sands and W. Wilkinson).

Many of these records are from dead branches, tree stumps, and similar habitats. It also frequently constructs low hard mounds of a mixture of soil and carton. On a few occasions, it has been found in mounds built by other termites such as *Cubitermes* and *Pseudacanthotermes* spp., but this is uncommon. It is the commonest and most widespread species occurring in East Africa.

ACKNOWLEDGMENTS

I wish to thank Dr. W. G. H. Coaton for sending type material from the Fuller collection from South Africa, and for his generous loan of material from his own collection from Northern Rhodesia. My thanks are also due to the Trustees of the British Museum (Natural History) for permission to examine types and other material in the termite collection.

SUMMARY

Examination of a large amount of material collected by members of the Colonial Termite Research Unit and other workers has led to the conclusion that the genus *Amitermes* is represented by 13 species in the entire Ethiopian zoogeographical region, and of these, three are new to science. In four species the imago is described for the first time. Three species are removed from the genus, having been found to belong to the subfamily Termitinae.

The reduction of 17 species to synonyms is based on a study of the wide range of variation, which is described and discussed. Keys are provided to the known soldiers and alates.

The distribution of the genus is characterized by the occurrence of comparable groups of a few species of similar ecological significance in the different vegetation zones of the region.

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NATURAL HISTORY

D. ELMO HARDY

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THE WALKER TYPES OF FRUIT FLIES (TEPHRITIDAE-DIPTERA) IN THE BRITISH MUSEUM COLLECTION[1]

By D. ELMO HARDY

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WHILE at the British Museum (Natural History) during the summer of 1954 I studied, as thoroughly as possible in the time available, the types of the species which Francis Walker had described under genera of fruit flies and also the species of Tephritidae which I could find in the collection which Walker had described under other family combinations (subfamilies of Walker). My original plan had been to study the Walker species belonging in the subfamily Dacinae but after the work got under way it became obvious that his generic concepts were so confused and so much synonymy and changing of names was involved that I decided I should study as many of his species as possible. From the literature I have accumulated a list of 172 species which Walker described under genera which belong in the Tephritidae. I have studied 127 of these, plus four species described under *Helomyza* and *Noeeta*, and I am reporting on these in this paper. I am appending a list of the 51 species (all described as *Trypeta*, except for three as *Tephritis* and four as *Helomyza*) which I did not have an opportunity to study. Nine of these could not be found in the British Museum collection and the types may be lost. I have checked the National Museum of Victoria at Melbourne, Australia, and apparently none of these is present in that collection.

Walker's fruit-flies were described under the family Muscidae and in the subfamilies Ortalides and Helomyzides. His generic, as well as family, concepts were somewhat confused and many of the species which he described as *Dacus* and *Trypeta* belong in the families Otitidae, Pyrgotidae, Chloropidae and Lauxaniidae; some of his "Helomyzides" belong to various genera of Tephritidae.

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[1] Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Technical Paper No. 429.

It has been impossible to deal with most of Walker's species in the past and many of these have never been properly placed in the literature. It is hoped that this study will clarify most of the confusion which has existed regarding the species treated here.

I am treating the Walker species in alphabetical order under the original generic combinations. I have attempted, as far as possible, to place each species in its correct generic combination and to record all synonyms which came to light as a result of this study. I am also presenting a check list of these species arranged alphabetically under their correct generic combinations. In order to place many of the species properly it has been necessary to do revisional studies on certain of the genera involved. These studies will be published following this paper.

I am much indebted to Harold Oldroyd, Paul Freeman, and D. J. Clark of the British Museum (Nat. Hist.) staff, and to the late F. Van Emden of the Commonwealth Institute of Entomology for the constant help given me while making this study. The drawings have been made by my wife, Agnes Hardy; these should add materially to the value of this study.

ALPHABETICAL ARRANGEMENT OF THE WALKER SPECIES ACCORDING TO THEIR ORIGINAL COMBINATIONS

Adrama consors Walker

(Pl. 11, fig. 1)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 296.

The type was not labeled. One specimen (sex?) is in the collection which might possibly be the type. It is labeled "East Indies, Bachan", plus a handwritten label "*consors*". The specimen is in poor condition, the abdomen is lost, the head has been broken off and glued on a card; the legs and thorax are intact and the wings are good except one is broken at the tip.

It does not belong to the genus *Adrama* Walker. The femora are without ventral spines; vein $R_2 + 3$ is not wavy; the humeral bristle is absent and only the basal scutellar bristles are present (two scutellars). It is an Adramini and runs to *Sosiopsila* Bezzi in Hering's key (1941, *Siruna Seva,* **3** : 4) but is very different from any of the species in the British Museum collection. I see no distinct generic differences except possibly that the cubital cell in *consors* is produced into an acute lobe at lower apex and is but slightly produced in *Sosiopsila.* Also in the latter, the lower apex of cell 1st M_2 is farther from the wing apex (last section of vein M_3+4 about equal in length to r-m crossvein); in *consors* it is very close to wing margin, scarcely one-half the length of the r-m crossvein.

I am considering this under the new combination *Sosiopsila consors* (Walker) until the group can be more thoroughly studied. *S. consors* is a large, chiefly rufous species. It is very distinctive because of the presence of a very narrow brown costal band extending from the apex of subcosta to about middle of cell R_5. The cubital cell is also chiefly yellow fumose (refer to Pl. 11, fig. 1). *Thorax:* Entirely rufous except for a pair of characteristic eye-like black spots, one on each side just before suture. The pleuroterga are covered with fine hairs. *Head:* Face entirely yellow. Front yellow with a large black spot above lunule. Apparently one pair of inferior fronto-orbital and one pair of superior fronto-orbital bristles present on the front. Antenna yellow, third segment about three times longer than wide. Arista short plumose, longest hairs scarcely more than width of basal portion of arista. *Legs:* All rufous to yellow, the middle tibia has one long and one medium-sized apical spur.

Length: Wings, 9·0–9·5 mm.

Adrama selecta Walker

(Pl. 11, fig. 2)

1859, *Jour. Proc. Linn. Soc. Lond.* **3**: 118.

This is the type of the genus *Adrama* Walker.

The type is apparently not in the British Museum collection. One male specimen, in good condition, is present from " New Guinea, Bachan, *A. R. Wallace*, B.M. 1858–142 "; the type was from " Aru Island " (Aroe). Another specimen (sex?), in poor condition, lacking both head and abdomen is labeled " New Guinea *W. W. Saunders* B.M. 1869–4 ". The latter had been determined as *Adrama selecta* by F. A. Perkins, University of Queensland.

The male specimen which Perkins (1939, *Univ. of Queensland Papers, Dept. Biol.* **1 (10)**: 5) mentioned, " with the abdomen missing from Aru Is. (*A. R. Wallace*) ", as having been studied from the British Museum collection was probably the type. It is not known what happened to the specimen; however, I was not able to find it in the collection.

Enicoptera rufiventris Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5**: 163. New synonymy based upon a comparison of the type of the latter with the *Adrama selecta* specimens in the British Museum collection.

According to Osten Sacken (1881, *Annali del Museo Civico di Storia Naturale di Genova,* **16**: 474), *Psila cruciata* Walker (1865, *Jour. Proc. Linn. Soc. Lond.* **8**: 126) is a synonym of *selecta*. I was unable to find the type of *cruciata* in the British Museum collection and am unable to confirm this.

A. selecta has been adequately described by Perkins (*loc. cit.*) but his wing photograph is not good. A rather distinct transverse band extends across the middle of the wing from the costal margin, over the r-m crossvein through the middle of cell 1st M2, to vein M3 + 4 and the apical portion of the wing is more intensely fumose than is shown in Perkin's figure. The apical portion beyond the level of the m crossvein is fumose, this fumosity fades out slightly in the apices of cells R5 and 2nd M2 (Pl. 11, fig. 2).

The species is related to *A. determinata* (Walker) but is differentiated by having the propleura and sternum of thorax entirely rufous and by having two black spots on the face.

Length: Wing, 8·0–9·0 mm.

Callantra smieroides Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 154.

Walker's description indicated a female but the specimen in the collection labeled type and with Walker's handwritten label " *smieroides* " is a male. It is in rather poor condition, the wings and most of the legs are missing. The specimen is labeled " Macassar, Celebes, *A. R. Wallace* ".

This is the type of *Callantra* Walker and the species has been correctly interpreted in the literature. For a description and figures refer to Hardy & Adachi (1954, *Pac. Sci.* **8** (**2**) : 151–152).

Dacus absolutus Walker

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 22.

The type female from " Ceram, *A. R. Wallace*, 68–4 " is in good condition but the specimen is obviously teneral ; the ptilinum is still partly protruded. The mesonotum seems well colored but the wings are pale, the markings are not distinct. This apparently is a *Dacus* (*Neodacus*) and was not included in my revision (Hardy, 1954, *Proc. Ent. Soc. Wash.* **56** (**1**) : 5–23). It runs to couplet 5 but is quite different from any of the species treated. The costal band is rather faint (tenerality?), it appears to be rather narrow, extending just through the top margin of cell R3 ; it is not broad as in those which fit in couplet 7 and the mesonotum has but two postsutural yellow stripes. In this regard it keys to *affinis* Hardy, from India, but the costal band is not interrupted and no isolated wing spot is present, etc.

Descriptive Notes on the Type

Head : Front almost two times longer than wide, chiefly yellow, discolored with brown in the median portion and with two pairs of inferior fronto-orbital bristles. Face with a pair of moderately large, round black spots. The first two antennal segments are rufous, the third is reddish brown ; the third segment is slightly longer than the face. *Thorax :* Predominantly black in ground color, the mesonotum is rather densely gray pollinose with no evidence of longitudinal vittae. The lateral yellow stripes are very broad and extend to the hind margin of the mesonotum. The top margin of the pleura is almost entirely rufous from the humerus to the wing base, a slight discoloration of brown through the front margin of the mesopleura separates the yellow rufous coloring of the mesopleural stripe from being continuous with that of the humerus. Scutellum tinged with brown (it may be slightly discolored in this specimen), the apical portion appears to have a faint discoloration of brown but no distinct brown mark is present. *Wings :* As described above with no distinct brown costal band but with rather faint yellow fumosity extending along the costa to the apex of vein R4 + 5, this extends along the top margin of cell R3. The cubital streak is not pronounced, there is no distinct fumosity in this portion of the wing. The first two costal cells are entirely hyaline, the second is almost completely filled with microtrichia ; the first has microtrichia only in the apical portion. The r-m cross-vein is oblique, the lower end is situated near the apical one-third of cell 1st M2. Vein Cu1 + 1st A is about three-fourths as long as the attenuated portion of the cubital cell. *Abdomen :* Predominantly rufous, the first tergum is broadly blackened on the sides and discolored with brown on the median portion. The second has a band of brown to black extending from near the sides across the median part of the segment, this is less distinct in the submedian portions. The third tergum is largely rufous, is black on the sides and has a narrow band of black extending across the median portion. The other terga are entirely rufous except for a narrow longitudinal black vitta extending down the middle of the fifth. Ovipositor rather elongate, the basal portion, *in situ,* is approximately equal in length to segments three to five.

Length : Wing, 8·4 mm.

Dacus addens Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 149.

The type female is in good condition, it is labeled " Celebes, *A. R. Wallace,* B.M. 1858–142 ".

This is an otitid and is the type of the genus *Conicipithea* Hendel, 1914, *Abh. Zool.-Bot. Ges. Wien,* **8** (**1**) : 29. Refer to Hendel for a discussion of this species.

Dacus areolatus Walker

(Pl. 11, fig. 3)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 295.

The type female is in good condition, it is labeled " Batchian, *A. R. Wallace* 68–4 ". This is a *Dacus* (*Paradacus*) Perkins, very distinct from all known species. It is closest to *D. perplexus* Walker but is smaller, lacks the median yellow vitta on the thorax ; the wings are quite differently marked ; the costal cells are clear and the wing apex is fumose through cell R5 (Pl. 11, fig. 3) ; the yellow mark on each mesopleuron also does not extend to the humerus.

Descriptive Notes on the Type

Head: Front yellow, discolored with brown in the middle and with a large brown spot at the base of each bristle. Two pairs of inferior fronto-orbitals are present. The face has two pairs of brown spots, two moderately large, oval spots in the usual positions in the antennal furrows and two small spots in the upper portion of the furrows just below the antennae. Antenna entirely yellow, the third segment just slightly longer than the face. *Thorax:* Predominantly reddish brown with a pair of broad, postsutural yellow stripes extending just beyond the inner alar bristle. That portion of thorax between humeri and notopleura reddish brown. Scutellum yellow with a narrow black band across the base. *Wings :* Predominantly brown fumose. The first costal cell, basal half of second costal cell, the first basal cell, and cell M, are hyaline. Cell M has a small brown area covered with microtrichia at the lower apical portion. The basal two-fifths of cell 1st M2 is hyaline. M2 also has a moderately small hyaline spot on the upper portion just beyond the r-m crossvein ; directly in line with this, above, cell R5 has a rather elongate hyaline spot. The apical portions of cell 2nd M2 and cell M4 are hyaline. The posterior lobes of the wing are also hyaline. The first costal cell is entirely bare, the second has microtrichia in about the apical half (refer to Pl. 11, fig. 3). The abdomen is entirely rufous. The basal segment of the ovipositor is very elongate and tubular, it is longer than the remainder of the abdomen as seen *in situ*. The base of the ovipositor is parallel sided, it is as broad at base as at apex.

Length : Body, 6·8 mm.; basal segment of ovipositor, 3·5 mm.

Dacus basalis Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1072.

The type male is in the collection under the genus *Plagiostenopterina* Hendel (" Ortalidae "—Otitidae). The type is labeled " Australia, Northern Terr., Port Essington, B.M. 1842–1 ". It is in fair condition, the parts are intact except for lacking one middle leg ; the body is covered with a light film of fungus.

The species is listed under the combination *Plagiostenopterina basalis* (Walker) by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 49, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 64).

Dacus biarcuatus Walker

(Pl. 11, fig. 4)

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 122.

The type male labeled " New Guinea, *W. W. Saunders*, B.M. 1868–4 " is in fair condition except that one wing is missing. This is a *Dacus* (*Strumeta*) Walker, and appears to be on the borderline between *Strumeta* and *Neodacus*. It has a pair of small prescutellar bristles, but these are much more poorly developed than is normal for *Strumeta*. It more closely resembles *Dacus* (*Neodacus*) *curvifer* Walker than any known *Strumeta*. The wing markings are quite similar (Pl. 11, fig. 4). It is separated by the presence of the prescutellar bristles. The postsutural yellow stripes are also very short, ending halfway between the anterior and posterior supraalar bristles. The mesopleural stripe is more narrow and does not extend along the entire upper margin of the mesopleuron. The femora are dark colored (brownish) on the apical halves and the species is also smaller in size.

Descriptive Notes Based on the Type

Head : Front about one-half longer than wide, chiefly yellow with a brown spot at the lower median portion which has an extended arm reaching up to the upper inferior fronto-orbital bristle and another arm reaching to the lower inferior fronto-orbital bristle. The superior fronto-orbitals each have a large brown spot surrounding the base, these extend almost to the middle line of the front. Face with a pair of large, round, black spots. First antennal segment entirely yellow, rather elongate, almost equal in length to the second segment. The third segment is long and slender, approximately five times longer than wide and considerably longer than the face. *Thorax :* Mesonotum entirely black, faintly grayish pollinose with no distinct black or gray vittae. The postsutural yellow vittae are abbreviated and extend only about halfway from the suture to the hind margin of the mesonotum. The upper front corners of the humeri are brown ; the remainder is yellow. The yellow vertical stripe on the mesopleuron is rather narrow, it extends over approximately half the width of the segment and ends at the lower portion of the mesopleuron, not extending to the sternopleuron. Scutellum yellow with a rather broad, black band across the base, this is somewhat expanded in the median portion. From a direct dorsal view the black mark at the base extends almost one-third the length of the scutellum. *Wings :* Chiefly dark brown fumose. The costal cells are densely covered with microtrichia ; the markings are as in Pl. 11, fig. 4. *Legs :* Femora chiefly brown. The front and middle pairs are yellow at their bases and apices. The hind pair is yellow at the base. The hind tibia is entirely brown. The middle is brown on the basal half. The front tibia is tinged with brown on the under portion at the base. The tarsi are entirely yellow. *Abdomen :* All black except for a reddish tinge at the apex of the second tergum and except for the rufous colored conjunctiva of the venter.

Length : Wing, 7·0 mm.

Dacus bicolor Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1071.

The type male is in fair condition, the specimen contains no locality nor collector label. This is an otitid and is in the collection under the genus *Icteracantha* Hendel. A notation is on the label to the effect that the species is a synonym of *chalybeiventris* (Wiedemann) and that *Scelacanthina* Enderlein is a synonym of *Icteracantha*.

Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 55, and 1914, *Abh. K. K. Zool-Bot. Ges. Wien,* **8** (**1**) : 87) lists *bicolor* in synonymy with *I. chalybeiventris*.

Dacus bilineatus Walker

(Pl. 11, fig. 5)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 150.

Type female present in collection labeled " Celebes, Makassar, *W. W. Saunders*, B.M. 1868–4 ". The type is in rather poor condition, the abdomen and the apex of one wing are broken. This is a Trypetinae belonging to the genus *Dimeringophrys* Enderlein (1911, *Zool. Jahr.* **13** (**3**) : 452). *D. ortalina* Enderlein, the type of the genus (from Sumatra), is a new synonym of *D. bilineatus* (Walker).

The genus is characterized from other Trypetinae with four scutellar bristles by having just one pair of orbital bristles. It fits near *Euphranta* Loew and related genera by having the pleurotergite haired. The reduced chaetotaxy and the elongate third antennal segment would place this near the borderline of the tribe Adramini under the subfamily Dacinae and in Hering's key (1941, *Siruna Seva*, **3** : 4) it would run to *Pseudosophira* Malloch but the bristles of the front are quite different, the pleurotergite is haired, vein R2 + 3 is straight and the cubital cell is distinctly pointed below (Pl. 11, fig. 5).

Descriptive Notes on the Species

Head: Front about one-third longer than wide, measured from the lunule to the lower ocellus, and possessing just one pair of orbital bristles; these are situated close to the anterior margin and are directed inward. The face is very gently concave and has a distinct moon-shaped groove across the median portion. The face and antennae are entirely yellow with no dark marks. The third antennal segment is elongate, three to four times longer than wide and rounded at the apex. The arista is moderately long plumose, the longest hairs are slightly longer than the width of the third segment. The palpi are yellow and are broad and rounded with rather numerous short, black hairs along the apex and the ventral margin; the palpi are about one-half broader than the third antennal segment. The genae are narrow, not equal in width to the palpi. *Thorax:* Mesonotum about one-half longer than wide, predominantly rufous with a dark brown to black stripe extending down each submedian margin, just inside each humerus from the front to the hind margin. The median portion and the sides are rufous. The scutellum is entirely yellow. The humeri and notopleural calli are yellow, the humeral bristles are well developed. The pleura are chiefly brown to black. The upper hind corner of each mesopleuron is yellow. The notopleura are entirely black. I see no evidence of prescutellar bristles on the type and a very weak pair of dorsocentrals is developed. These are situated slightly in front of a line drawn between the posterior supraalar bristles. There are four strong scutellar bristles developed. *Legs:* The coxae are dark brown to black. The front femora are brown on the apices and bases, yellow in the middle. The middle femora and hind femora are brown on the bases and yellow on the apical halves. The tibiae are all brown to black. The tarsi are yellow to rufous with brown apical subsegments. The single spur at the apex of the middle tibia extends slightly over one-third the length of the basitarsus. *Wings:* As in Pl. 11, fig. 5. Predominantly hyaline but with distinct yellow fumosity along the costa, in basal cells, and over the m crossvein. The first costal section is hyaline, the second is light yellow fumose and is densely covered with microtrichia. The cubital cell has a moderately acute lobe at its lower apex, this is slightly longer than the vertical section of Cu1. The r-m crossvein is situated at the apical three-fifths of cell 1st M2. Vein R1 is entirely setulose, the setae extend over vein R below the humeral crossvein. Vein R4 + 5 is setulose well beyond the r-m crossvein.

Length: Wing, 7·0–8·0 mm.

Dacus brevistriga Walker

1860, *Trans. Ent. Soc. Lond. n.s.* **5**: 322.

The type was not designated in the collection but a female specimen labeled "South Africa, Natal, *W. W. Saunders, B.M.* 1868–4" is apparently the type. It is in fairly good condition except for the presence of some debris on the body and for the loss of some of the bristles.

The type is a *Dacus* (*Daculus*) and does not seem to conform to the concepts of this species which I have seen in the literature. Bezzi (1924, *Bull. Ent. Res.* **15** (**1**) : 86) treated it in his key under his category " species of greater size ", with a broad costal band or large apical spot in the wing ; it would better fit in his group of smaller species with a rather narrow costal band and seems to fit *Dacus katonae* Bezzi (*loc. cit.*) amended to *katonai* by Munro (1935, *Ann. Mus. Nat. Hung.* **29** : 134, fig. 2). The Walker specimen in the collection fits Munro's figure of *katonae*. I cannot be sure of this synonymy since I have not had an opportunity to study enough material. Munro (1930, *Bull. Ent. Res.* **20** (4) : 392, and 1957, *Brit. Mus. Ruwenzori Exped.* **2** (**9**) : 860) places *D. asclepiadens* Bezzi as a synonym of *brevistriga*.

Length : Body, 6·0 mm.

Dacus concisus Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 252.

The type female is in rather poor condition, one wing being missing and the other is broken off before the apex, also the specimen is covered with debris. It is labeled " Dor, 68·4 ", evidently for Dorey, New Guinea.

This species belongs to the genus *Diplochorda* Osten Sacken and is in the collection under the family " Ortalidae " (Otitidae). This genus has been placed in the family Phytalmiidae by most authors. Hering (1941, *Siruna Seva*, **3** : 3) places *Diplochorda* in the tribe Phytalmiini under the subfamily Dacinae, " Trypetidae " (Tephritidae). Hennig (1940, *Arb. über Morph. und Tax. Ent.* **7** (**1**) : 60) indicates that *Diplochorda* and related genera fit best into the fruit fly family (Tephritidae). Malloch (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**1–2**) : 169, and 1940, *Ann. Mag. Nat. Hist. ser. II*, **6** : 88) treated the Phytalmiinae and the Angitulinae (or Phytalmiini and Angitulini, if these were treated as tribes under Tephritidae and Otitidae respectively) under the family Phytalmiidae although he admitted that the group is obviously " composite in nature " and " is a difficult one to place in our present system of classification, possessing as it does several confusing characters ". He points out that the various genera possess characters which are borderline between the two families and which weaken the value of the characters used for separating them. Steyskal (1950, *Wasmann Jour. Biol.* **8** (**1**) : 93) says he believes " it unwise to abandon the family Phytalmiidae until more is known about the biology of its members, the forms involved and its nearest relatives ". I am following Hering in considering *Diplochorda* in the tribe Phytalmiini under the Dacinae.

Dacus turgidus Walker (1865, *Jour. Linn. Soc. Lond.* **8** : 134) is a synonym. This synonymy was recorded by Osten Sacken (1881, *Ann. Mus. Civ. Stor. Nat. Genova*, **16** : 487).

Dacus conformis Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 34.

No type had been designated but a female specimen, in good condition, labeled " *conformis* " in Walker's handwriting is apparently the type. It is from " Singapore, *W. W. Saunders*, B.M. 1868–4 ".

This is the type of Walker's genus *Strumeta*, which I treat as a subgenus of *Dacus* (see Hardy, 1955, *Ann. Ent. Soc. Amer.* **48** (**6**) : 436) and is a synonym of *Dacus* (*Strumeta*) *umbrosus* Fabricius (see Hardy & Adachi, 1954, *Pac. Sci.* **8** (**2**) : 184).

Dacus contrahens Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 151.

The type male is in good condition except that the front margin of one wing is partly broken. It is labeled " Celebes, Macassar, *W. W. Saunders*, B.M. 1868-4 ". This is an Otitidae belonging in the genus *Pseudepicausta* Hendel. It is treated under this combination by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64).

Dacus curvifer Walker

(Pl. 11, fig. 6)

1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 229.

The type male is in good condition, it is labeled " Waigiou, A. R. Wallace. 68-4 ". Walker had indicated a female specimen in his description.

This is a *Dacus* (*Neodacus*) Perkins and has been adequately described in my revision of this subgenus (Hardy, 1954, *Proc. Ent. Soc. Wash.* **56** (**1**) : 8). *Dacus speculifer* Walker (1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 122) is a new synonym.

I find considerable variation in the wing maculation in this species. Some specimens have a continuous hyaline mark extending from the wing margin at apex of cell 2nd M2, through cell R5 to vein R4 + 5 ; the type of *curvifer* is this way. Some also have a continuous hyaline streak extending from the wing margin at lower portion of cell M4 up through cell 1st M2, near base ; through cell R to vein R4 + 5 below the r-m crossvein. Also a hyaline mark sometimes extends from vein R4 + 5 obliquely through cell 1st M2, ending at vein M3 + 4 at about the apical one-third of the cell ; this is also the case in the type of *curvifer* (Pl. 11, fig. 6). The markings show definite intergradation between this pattern and the wing which I figured (*loc. cit.*) ; the type of *D. speculifer* Walker fits my drawing of *curvifer*.

Dacus determinatus Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.

The type male is in poor condition, and the wings are missing. It is labeled " Sarawak, Borneo, A. R. Wallace, ex coll. *Saunders*, 68.4 ". This belongs in the genus *Adrama* and the species is apparently widely distributed. A large series of specimens are in the British Museum collection and in the University of Hawaii collection from Borneo, Java, Philippine Islands, Malaya, Thailand, Burma, Ceylon, and India.

Adrama austeni Hendel, 1912, *Wien. Ent. Zeit.* **31** : 12, is a new synonym ; based upon the comparison of the types of both in the British Museum collection.

This species is closely related to *A. selecta* Walker but is distinguished by having the propleura and sternum of the thorax largely polished black, rather than entirely rufous and the face with a single broad black spot above the epistoma, rather than with two black spots. The apical portion of the wing beyond a level of the m crossvein is brown and a transverse brown band extends through the r-m crossvein.

Length : Wing, 8·0 mm.

Dacus detrudens Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 135.

A specimen in the collection, sex unknown, is labeled " ? type ". It is in poor condition, the abdomen is broken off and only one antenna, one front leg, one middle leg and no hind legs are present. The pin contains a handwritten label " *detrudens* " plus " East Indies, Misol, *W. W. Saunders*, B.M. 1868–4 ". This is in the collection under the genus *Pseudepicausta* (Otitidae). It is also treated under this combination by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64).

This specimen from Misol is apparently Walker's type although his specimen was supposed to be from the Island of Salwatty, New Guinea. The Misol specimen does not fit the original description, the face is all yellow, with no black band near the epistoma ; the wings have a brown band extending longitudinally from base to r-m crossvein and the antennae are yellow, not " piceous ". A male specimen in the collection under *Dacus detrudens* labeled " Sumatra, *W. W. Saunders*, B.M. 1868–4 " is more nearly like Walker's description ; it seems to fit in all respects except that the head is missing so I was unable to check these characters.

Dacus devius Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 250.

Both of Walker's specimens, a male and a female, are present and both are labeled " type ". The male was the first mentioned and should be the type, it is labeled " N. Guinea, Dorey, B.M. 68.4 ". The allotype female is labeled " Dory 59–58 ". They both are in good condition except that the female is covered with debris.

This is in the collection under the genus *Antineura* Osten Sacken (Otitidae). Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 41, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 36) lists it as *Antineura devia* (Walker).

Dacus diffusus Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 153.

Two specimens are in the collection under this name, neither is marked type. They are labeled " Celebes, nr. Macassar, *A. R. Wallace*, B.M. 1858–142 ". One is a female and was probably the specimen discussed by Walker ; it is in very poor condition, the head and abdomen are missing. The other specimen, a male, is in fair condition, one wing is gone and the specimen is obviously teneral. I have designated this specimen as a lectotype.

These are teneral (almost completely pale) specimens of *Dacus* (*Strumeta*) *umbrosus* Fabricius. This is a new synonym.

Dacus discipennis Walker

(Pl. 11, fig. 7)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 294.

Walker indicated a female in the description but the unique specimen in the British Museum is a male labeled " Moluccas, Bachan, *W. W. Saunders*, B.M. 1868–4 ". It is also labeled " *discipennis* ", apparently by Walker and is probably the type.

This is a *Dacus* (*Daculus*) Speiser, looking more like *Neodacus* (but there is no evidence of anterior supraalar bristles) than any of the *Daculus* brown to me. It is very characteristic because of the wing markings, almost all brown with a hyaline longitudinal streak through the center (Pl. 11, fig. 7) ; also because of the yellow coloring of the humerus being continuous with that of the notopleuron. *Head :* The front is entirely yellow, about one-half longer than wide and with three weak inferior fronto-orbital bristles present, the lower pair is rudimentary. The swollen portion of the front is not discolored and there is no discoloration at the bases of the bristles. The face is yellow with rather large, oval black spots in the antennal furrows. Antennae yellow, the third segment is slightly longer than the face. Occiput entirely yellow. *Thorax :* Mesonotum chiefly black with broad yellow vittae on the sides, the lateral margins are completely yellow to rufous, the portion between the humerus and the notopleural callus is yellow. The scutellum is yellow with a narrow black base. *Wings :* The first two costal cells are densely covered with microtrichia and are yellow-brown fumose, as is the remainder of the anterior portion of the wing. Wing with a longitudinal hyaline streak extending through the median portion from the base of cell M to the m crossvein (Pl. 11, fig. 7). *Abdomen :* Chiefly brownish red. The second tergum is yellow on the apical one-fourth to one-third. The fourth tergum has an indistinct yellow marking in the median posterior portion and the apex of the fifth tergum is yellow. The sides of the abdomen are gently rounded so that the ventral portion is concave. The sterna are contained within a rather deep concavity.

Length : Wing, 8·8 mm.

This species has been discussed by Hardy & Adachi (1954, *Pac. Sci.* **8**(**2**) : 153).

Dacus divergens Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 149.

The type male is in good condition, it is labeled " Celebes, nr. Macassar, coll. *A. R. Wallace*, B.M. 1858–142 ".

This is an Otitidae, in the collection under the genus *Philocompus* Osten Sacken. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 42, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 31) lists it under this combination.

Dacus emittens Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 152.

No type has been designated. Six specimens are in collection under this name labeled " Celebes nr. Macassar, *A. R. Wallace*, B. M. 1858–142 ". A female specimen labeled by Walker and fitting his description is probably the type. Of the six specimens only four are *emittens*, a female specimen of *D.* (*Strumeta*) *cucurbitae* Coquillett is in the series. Another male in the series appears to be *D.* (*Strumeta*) *bryoniae* Tryon (these specimens are the so-called varieties which Walker mentioned).

This large species is a *Dacus* (*Zeugodacus*) Hendel and is readily recognized by its wing coloration. The broad costal band extends through all of cell R3 and expands at the apex into a large brown spot which fills all of the apex of the wing, except for the margin in the middle of cell 2nd M2. The band extends continuously across the m-cu crossvein through cell M4 almost to the cubital streak. The body color is chiefly rufous, the mesonotum has three postsutural yellow stripes. The basal segment of the ovipositor, *in situ*, is slightly longer than segments four and five combined.

Length : Wing, 9·0 mm.

The species has been described and figured by Hardy & Adachi (1954, *Pac. Sci.* **8** (**1**) : 187–188).

Dacus exigens Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 151.

The type male is in poor condition, the abdomen, one middle leg and one antenna are broken off and the face is covered with debris. It is labeled " Celebes, Macassar, *W. W. Saunders*, B.M. 1868–4 ".

It is an Otitidae, in the British Museum collection under the genus *Pseudepicausta* Hendel. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64) treats it under this name.

Dacus expandens Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 114.

The type is a male, in good condition, labeled " Borneo, Aru Is. *W. W. Saunders*, B.M. 1868–4 ". Walker's original description indicated that he had a female specimen.

This is a *Dacus* (*Paratridacus*) Shiraki and the species has been adequately described and figured (Hardy, 1951, *Pac. Sci.* **5** (**2**) : 140–141).

Dacus expertus Walker

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 14.

The type female is in very poor condition, the only part intact is one wing, one hind leg is present except for the apex of the tarsus ; the abdomen is gone and the thorax is almost so—only a shell remains on one side. The head is present but is covered with debris and the antennae are present but the aristae are broken off. The specimen is labeled " East Indies, Gilolo, *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae and is in the collection under the genus *Pseudepicausta* Hendel. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64) lists it under this name.

Dacus figuratus Walker

(Pl. 11, fig. 8)

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.

The type female is labeled " Borneo ", no collector or date is given. The specimen is in very poor condition, the head is missing, the wings have been broken off and are glued on a card, the legs and other characters are somewhat obscured by the way the specimen is mounted.

I am unable definitely to place this to genus, it is a Trypetinae, very probably belonging to the genus *Euphranta* Loew, at least it appears to be a Euphrantini. The pleuroterga are covered with fine erect hairs. A weak sternopleural bristle is present, this is rudimentary and is pale in color. If one considers the sternopleural as lacking the specimen would seem to fit near *Xanthotrypeta* Malloch ; it is quite a different species, however, than the genotype (*bimaculata* Malloch). It could also possibly fit near *Cyclopsia* Malloch ; it is quite distinct, however, from the genotype (*inaequalis* Malloch).

Descriptive Notes on the Type

Thorax : Almost entirely shining black on the dorsum with a broad yellow mark on the median hind portion, covering the area between the dorsocentral bristles, narrowing in the middle and extending anteriorly about three-fifths the distance to the suture. The median portion of the mesonotum has a broad gray fascia extending the entire length, the sutures are also gray. The scutellum has four strong bristles and is entirely yellow, except for its extreme base and except for the basal margins, on the sides. The metanotum is all black ; the humeri and notopleural calli, except for the lower edges, are yellow ; the lower portion of each notopleural callus is black. The pleura are polished black, except for the yellow propleura. Except for the yellow upper margin of each mesopleuron the yellow coloration is continuous with that of the humerus and is expanded on the posterior portion to cover almost half the length of the mesopleuron. A narrow longitudinal, yellow vitta extends across the top border of each sternopleuron and continues on into the yellow of the propleuron. *Legs :* Predominantly rufous, the middle and hind tibiae and tarsi are brown to black. *Wings :* As in Pl. 11, fig. 8. The apical portion is dark brown fumose ; the anterior portion of the wing, from the subcostal vein to the brown apical mark, is intensely yellow fumose, this fumosity extends across the wing over the r-m crossvein fading out in cell 1st M2 (Pl. 11, fig. 8). Vein R1 is setulose throughout its length, the setae extend down the node a short distance beyond the humeral crossvein. Only the basal portion of vein R4 + 5 is setulose, the setae extend about two-fifths to half the distance to the r-m crossvein ; there may be a few scattered setae beyond this point and the r-m. The stem of Rs is bare. Vein R2 + 3 is straight or nearly so. The cubital cell has a short, acute lobe at the lower apex, approximately equal to the length of the vertical portion of Cu1 (Pl. 11, fig. 8).

Length : Wing, 6·0 mm.

Dacus fulvitarsis Walker

(Pl. 11, fig. 9)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 153.

No specimen can be found in collection labeled *fulvitarsis* and it is not in the card file. A specimen is in collection, however, labeled *D. pallitarsis* Walker " Celebes, Macassar, *W. W. Saunders*, B.M. 1868–4 ", which fits Walker's description of *fulvitarsis*. I can find no reference to a *pallitarsis* being described and feel that this is Walker's type of *fulvitarsis*. It is in rather poor condition, the antennae, hind legs and apical half of the abdomen are gone and the body is covered with considerable debris. This is a chloropid, genus? I cannot find it represented in the B.M. collection. It is almost entirely subshining black, the middle legs have the basal two tarsal segments yellow and the bases of the femora yellow. The bases of the front femora are faintly yellowish. The legs are otherwise black (the hind legs are missing). The front is subshining black, the face and occiput are conspicuously white pubescent. The wings seem to be characteristic (see Pl. 11, fig. 9) ; they are slightly fumose in the apical portion and over the m crossvein.

Dacus furcifer Walker

(Pl. 12, figs. 10*a–c*)

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 14.

One male specimen in the collection is labeled " East Indies, Gilolo, *W. W. Saunders*, B.M. 1868–4 ", with Walker's label "*furcifer*" and is probably the type but it is not labeled as such. It is in good condition except for some debris scattered over the body.

This is a borderline species fitting between Euphrantini and Adramini. I consider it to be a Trypetinae related to the genus *Euphranta* Loew and under this genus it would fit in the subgenus *Staurella* Bezzi by the presence of prescutellar bristles. *D. furcifer* would seem to fit *Adrama* Walker almost as closely as *Euphranta* except for the presence of moderately weak dorsocentral and prescutellar bristles, also by having only the front femora spinose (Pl. 12, fig. 10*b*) and the base of R not setulose much below the humeral crossvein. This apparently represents a new genus and I am proposing the name *Paraeuphranta*. *Paraeuphranta* is distinguished from all *Euphranta* known to me by having the front femora spinose beneath ; by having three pairs of inferior fronto-orbital bristles almost evenly spaced, the upper pair is approximately the same distance from the lower superior fronto-orbital as from the second pair of inferior fronto-orbitals. In *Euphranta* two or three pairs of inferior fronto-orbitals may be present ; when the latter is the case the lower two pairs are situated closer together with the upper widely spaced and near the superior fronto-orbitals (Pl. 12, fig. 10*c*). In *Paraeuphranta* the thorax, from dorsal view, is more elongate and narrow ; the width (measured at the humeri) is less than half the length, including the scutellum ; the proportions are 2 to 4·5. *Euphranta* have a more broad thorax, distinctly less than two times longer than wide ; the proportions are 2 to 3·5.

The resemblance of *Paraeuphranta furcifer* to *Euphranta* (*Euphranta*) *striatella* (van der Wulp)—new combination—is most striking. (*Note : striatella* was described as a *Lagarosia* van der Wulp, 1891, *Tijd. v. Ent.* **34** : 213, pl. 12, fig. 14. This was synonymyzed with *Euphranta* by Malloch, 1939, *Ann. Mag. Nat. Hist.* **4** (**11**) : 251. *Euphranta nigra* Enderlein, 1911 *Zool. Jahrb.* **31** : 440, fig. *q* is a new synonym of *E. striatella*, based upon the examination of specimens in the British Museum and by comparison of the original descriptions.) On the basis of wing venation there is very little difference between these. The costal band, however, in *furcifer* is broader at the wing apex, from end of R2 + 3 to about middle of cell R5 it is as broad as the oblique band from near apex of R2 + 3 to apex of M1 + 2 (Pl. 12, fig. 10*a*). Enderlein shows no apical band on his drawing of the wing of *nigra*. In the specimen of *nigra*. in the British Museum collection a very narrow band is present along the costa, extending approximately to the middle of cell R5. Enderlein states that his species is very close to van der Wulp's from Java but Enderlein presumed that *Lagarosis striatella* was an Otitidae.

Notes Based Upon the Type

Head : Front about two times longer than wide and possessing three pairs of inferior fronto-orbitals and one pair of superior fronto-orbitals (Pl. 00, fig. 10*c*). The front is entirely brown and the face is yellow with no markings ; it is concave in profile, with a rather marked transverse furrow across the median portion ; the lower margin is strongly produced so that the width of the face, measured at the epistomal margin, is approximately equal to the broadest portion of the occiput as seen in direct lateral view. The antennae are reddish brown, the third segment is rather slender, is three to three and one-half times longer than wide and extends slightly more than half the length of the face. The aristae are rather long plumose, the longest hairs are slightly greater than the width of the third antennal segment. The palpi are yellow-brown, slightly broader than the third antennal segment and are covered with short, black bristles on the ventral portion. *Thorax :* Subopaque brown, tinged with yellow on the humeri, propleura, and margins of scutellum, with gray pubescence on the sides of the mesonotum and along the suture. The presutural bristle is absent and the humeral bristles are well developed. The pteropleural bristle is present but is not as well developed as are the sternopleural and the mesopleural bristles. The pleurotergite is covered with fine, white hair. The scutellum has four strong bristles, the dorsal surface is thickly covered with short, recumbent black setae. The halteres are yellow-white. *Legs :* Dark brown to black. The front femora are slightly thickened and have four rather strong stout bristles or spines on the underside at apical one-third to two-fifths (Pl. 12, fig. 10*b*) ; other femora without strong bristles. Middle tibia with a single strong apical spur. *Wings :* As in Pl. 12, fig. 10*a*. Vein R1 is setulose throughout its length. The setulae extend down the stem of R well below the humeral crossvein. Vein R4 + 5 is setulose only to the fork of R2 + 3. The radial sector is bare. Vein R2 + 3 is slightly undulated. The r-m crossvein is situated near the apical fourth of cell 1st M2. The cubital cell has a short, acute point at lower apex, the length of this lobe is much less than the length of the vertical portion of vein Cu1 (Pl. 12, fig. 10*a*). *Abdomen :* Entirely dark brown to black, long and slender ; all of the terga are distinctly longer than wide. The abdomen is equal in length to the combined head and thorax.

Length : Wing, 8·4 mm.

Dacus imitans Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 150.

The type female is in the collection under the genus *Plagiostenopterina* Hendel (" Ortalidae "—Otitidae). It is labeled " Celebes, Macassar, *A. R. Wallace,* B.M. 1858–142 " and is in fair condition except for lacking the abdomen.

The species is listed under the combination *Plagiostenopterina imitans* (Walker) by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae,* p. 49).

Dacus inaptus Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 151.

A specimen in the collection (sex?) is not labeled type but is apparently one of the specimens mentioned by Walker (he indicated a male and a female). It is labeled " Celebes, Macassar, *W. W. Saunders,* B.M. 1868–4 ".

This is an Otitidae obviously belonging in the genus *Plagiostenopterina* Hendel. This is a new combination, Hendel did not treat this species in his 1914, *Gen. Ins.* 157. The species is closely related to *P. enderleini* Hendel (series in British Museum from the Solomon Islands and Papua) but differs by having vein R2 + 3 undulated and the first costal cell hyaline. In *enderleini* vein R2 + 3 is straight and the first costal cell is brown fumose. It also closely resembles *P. aenea* (Wiedmann) but the undulated vein R2 + 3 characterizes it. This character may be of generic importance, I found nothing else like this in the British Museum collection.

Dacus incisus Walker

1860, *Trans. Ent. Soc. Lond. n.s.* **5** : 323.

The type male is in poor condition although the specimen is fully hardened and the coloration is good. A portion of the thorax has been damaged by the pin and the two middle legs and one hind leg are missing. The type is labeled " Burma, ex coll. *W. W. Saunders,* 68–4 ".

This is a *Dacus* (*Strumeta*) Walker. It is in the collection under the name *Chaetodacus ferrugineus* var. *incisus* and has been rather commonly treated in the literature as a possible synonym of *D. dorsalis* Hendel. *D. incisus* proves to be quite distinct from *dorsalis* and is also distinct from the species which I had previously considered to be *incisus* Walker. *D. incisus* actually fits closer to *D. nigrotibialis* (Perkins), from Malaya, because of the predominantly black femora : the front femora are all black (the middle legs are missing) and the hind femora are black on the apical third. It differs from *nigrotibialis* by having a black band across the middle of the face connecting the lateral spots ; by the much narrower costal band in the wing as well as in a number of other details.

Descriptive Notes on the Type

Head : The front is about one-half longer than wide ; two pairs of inferior fronto-orbital bristles are present. The vertex has a black band extending transversely between the upper inner margins of the eyes, through the upper ocelli. *Thorax :* The mesonotum is almost entirely subopaque black, the lateral yellow vittae are broad and extend to the hind margin of the mesonotum. The scutellum is entirely yellow except for a very narrow black base. The yellow mark on each mesopleuron is separated from the yellow of the humerus by just a narrow black streak. *Wings :* The first and second costal cells are entirely hyaline ; the second has microtrichia in the extreme apex. The costal band is very narrow, it does not extend into cell R3 except at the wing margin. The cubital streak is broad. *Abdomen :* The first tergum has a narrow band of black across its base and is otherwise yellow. The second tergum is chiefly yellow with a narrow basal black band, expanded in the middle, which extends about two-thirds the length of the segment down the middle line. Terga three and four are entirely dark brown to black. Tergum five is black at its base and has a narrow black vitta extending longitudinally down the middle. The shining areas are rufous, tinged lightly with brown.

Length : Wing, 5·2 mm.; body, 6·0 mm.

Dacus inscriptus Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 162.

Walker's original description indicated that he had a female specimen. A unique specimen in the collection with a handwritten label " *inscriptus* " is a male. It is also labeled " Borneo, Ambong ". Walker's type was supposed to be from Amboyna. The specimen is in fair condition except that the antennae, mouthparts and head bristles are lost. The specimen fits Walker's description.

This is a Trypetinae belonging in the tribe *Euphrantini* and the genus *Cyclopsia* Malloch. The type of this genus *C. inaequalis* Malloch is a new synonym of *C. inscripta* (Walker).

This genus is almost borderline between the Euphrantini and the Adramini.

Dacus instabilis Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 250.

Walker indicated a female in his description but the unique specimen in the collection, containing a handwritten label " *instabilis* ", is a male. It is also labeled " New Guinea, Dory, *W. W. Saunders*, B.M. 1868–4 ". I believe this specimen is the type.

This is an Otitidae belonging in the genus *Lamprogaster* Macquart. *L. gracilis* Hendel is a new synonym of *L. instabilis* (Walker), based upon a comparison of specimens in the British Museum collection.

Dacus lateralis Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 123.

Walker indicated a male specimen in his description but the specimen under this name in the collection is a female. It is labeled " New Guinea, *W. W. Saunders*, B.M. 1868–4 ". This is probably the type. The specimen is in fair condition, the antennae are gone and some fungus is scattered over the body.

This is a Trypetinae belonging in the genus *Clusiosoma* Malloch. *C. biseriata* Malloch (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 426) is a new synonym, based upon the comparison of specimens in the British Museum collection.

Dacus latifascia Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 114.

The type female is in fair condition except that one wing has been broken off and the other is folded over in the posterior region. It is labeled " Aru Is., *A. R. Wallace*, ex *Saunders* Coll. 68.4 ".

This is an Otitidae and is in the collection under the genus *Cleitamia* Macquart. I am treating it under this combination. Bezzi (1913, *Mem. Ind. Mus.* **3** : 74) said this species was " an Ortalid belonging to *Xiria*, according to Prof. Hendel " Hendel (1914, *Gen. Ins.* 157) did not list the species under *Cleitamia* or *Xiria*.

Dacus lativentris Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 115.

The type was not designated but evidently is the female specimen which is labeled " *lativentris*, Borneo, Aru Island, *W. W. Saunders*, B.M. 1868–4 ". The specimen is in poor condition, the abdomen and middle and hind legs are missing.

This is an Otitidae and has not been identified in the British Museum collection. It is a *Plagiostenopterina* Hendel. I have compared this with the type and a series of paratypes (from Papua) of *Plagiostenopterina orbitalis* Malloch and find no way of separating them. Malloch's species is a new synonym of *P. lativentris* (Walker).

Dacus lituratus Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 251.

The type female is in fair condition except that the middle legs, the aristae and the front margin of the left wing are broken off. It is labeled " New Guinea, *A. R. Wallace*, 62–91 ".

This is an Otitidae belonging to the genus *Cleitamia* Macquart. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 73, and *Abh. K. K. Zool.-Bot. Ges. Wien.* **8** **(1)** : 129 has listed it under the combination *C. liturata* (Walker)).

Dacus longivitta Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 115.

The type male is in the collection under *Plagiostenopterina* Hendel (" Ortalidae "—Otitidae). It is labeled " Aru, *W. W. Saunders*, B.M. 1868–4 " and is in poor condition, the abdomen and one wing are missing and the other wing is broken.

The species is listed under the combination *Plagiostenopterina longivitta* (Walker) by Hendel (1914, *Ger Ins.* **157**, *Dipt. Muscaridae*, p. 49).

Dacus mutilloides Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 115.

The type female is in poor condition, the abdomen is missing and only one front leg, one hind leg, one antenna and one wing are present. It is labeled " Aru I., *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae and is in the collection under *Pseudepicausta* Hendel. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** **(1)** : 116) lists it under this genus.

Dacus? nigrilinea Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 251.

A female specimen is in the collection labeled " New Guinea, Dory, W. W. Saunders, B.M. 1868–4 ". It has not been designated but surely must be Walker's type. It is in poor condition, the parts are fairly intact except for missing one wing and one front leg but the thorax is half covered with fungus.

This is a Dacinae, belonging to the tribe Phytalmiini and to the genus *Phytalmia* Gerstaecker. I have compared *Phytalmia nigrilinea* (Walker) with the type of *P. wollastoni* Edwards (1915, *Trans. Zool. Soc. Lond.* **20** : 418, from Minika Riv., Neth. New Guinea) and Edward's species is a new synonym.

Dacus obtrudens Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 116.

The type male is in good condition, it is labeled " Aru Island, W. W. Saunders, B.M. 1868–4 ".

This is an Otitidae belonging in the genus *Pseudepicausta* Hendel. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64) has placed this into synonymy with *P. chalybea* (Doleschall) (1858, *Naturk. Tijds. v. Ned. Indie*, **17** : 125).

Dacus pectoralis Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 114.

Type female present in good condition except that the antennae are broken off. It is labeled " Borneo, Aru, *W. W. Saunders*, B.M. 1868–4 ". This is a *Dacus* (*Strumeta*) Walker.

Note : Dacus pectoralis Walker (1861) is an African species and is treated separately from Walker's Indonesian species.

Dacus ferrugineus var. *obscurata* de Meijere (1911, *Tijds. v. Ent.* **54** : 373) is probably a synonym of *D. pectoralis* (1859), based upon a comparison with de Meijere's original description. I have not had an opportunity to study the type of *obscurata*, it is supposed to be in the Zoologisch Museum, Amsterdam, but I have studied the de Meijere collection there and was unable to find the type. A female specimen labeled *obscurata* is present from Insel Enkhuizen (Pulu Njamuk Ketjil) nahe Batavia. One female specimen in the collection under *ferrugineus* seems to be labeled " Britenron (spelling?) 2–14–18 v.d. Good, Ex lambok ". This is a specimen of *D. dorsalis* Hendel.

The type of *pectoralis* (1859) seems to fit de Meijere's description of *obscurata* in all details except for size. According to the original description the body of *obscurata* is 5·5 mm. long and the wings are 5·0 mm. The measurements of Walker's type are 9·0 mm. for the body and 8·0 mm. for the wings. Other specimens which I have considered to be *pectoralis* (Hardy & Adachi, 1954, *Pac. Sci.* **8** (**2**) : 179–180) measured 7·0 mm. for the body and 6·5 mm. for the wings.

Descriptive Notes on the Type of D. pectoralis *Walker* (1859)

Head : Two pairs of inferior and one pair of superior fronto-orbital bristles are present. The black facial spots are round and moderate in size. *Thorax :* The humeri are yellow, the hind corners are faintly discolored with brown. The mesonotum is predominantly black and lightly grayish pollinose, with three very faint, lightly shining, longitudinal vittae. No distinct yellow vittae are present but the areas normally occupied by the vittae are tinged slightly with red giving indication of slight narrow vittae (not readily visible except in certain lights). It may be that the vittae have been obscured by discoloration in the type. The scutellum is yellow with a narrow black band across its base. *Legs :* Front and hind femora yellow on basal portions and brownish at apices; the middle femora are chiefly brownish red. The front and middle tibiae are yellow above and brownish below; hind tibiae chiefly brownish. The tarsi are yellow-white. *Wings:* Costal cells yellow-brown fumose and covered with microtrichia. Costal band rather broad, extending almost to vein R4 + 5 except at the apex and base of cell R3. The cubital streak is broad and vein Cu1 + 1st A is about three-fourths as long as the attenuated portion of cell Cu. *Abdomen:* Predominantly black, reddish brown at apices of segments. The shining spots on the fifth tergum are brownish black. The basal segment of the ovipositor, *in situ*, is approximately equal in length to the fifth abdominal segment.

Dacus pectoralis Walker

1861, *Trans. Ent. Soc. Lond. n.s.* **5** : 322.

I apparently overlooked the type of this African species. According to Munro (1948, *Bull. Ent. Res.* **38** (**4**) : 620) it is a synonym of *Dacus* (*Dacus*) *bivittatus cucumarius* Sack. The name is preoccupied by *Dacus pectoralis* Walker (1859) from Indonesia.

Harold Oldroyd has confirmed that the type, from Natal, is in the British Museum collection in the series of *D. bivittatus* Bigot. He said that " it is in fairly good condition, though at some earlier time it has been attacked by pests and has a hole in the thorax and the abdomen ".

Dacus perplexus Walker

(Pl. 12, fig. 11)

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 14.

Walker indicated a female as the type of this species, the unique specimen in the collection is a male labeled " East Indies, Gilolo, *W. W. Saunders*, B.M. 1868–4 ". The handwritten label " *perplexus* " on the specimen was probably put on by Walker. The female specimen mentioned by Perkins (1939, *Univ. Queensland Pap. Dept. Biol.* **1** (**10**) : 33) in the National Museum, Melbourne, " collected by A. R. Wallace at Gilolo and labeled by Walker *Dacus implexus*, Gilolo—almost certainly this is meant to be *perplexus* "—is most probably the type.

This is a *Dacus* (*Paradacus*) related to *D. areolatus* Walker, it is readily distinguished from all known Dacinae by its unusual wing markings (Pl. 12, fig. 11). Refer to description and figures by Hardy & Adachi (1954, *Pac. Sci.* **8** (**2**) : 156).

Dacus pompiloides Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 116.

The type male is in good condition except for some fungus on the venter of the thorax. It is labeled " Aru Island, *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae belonging in the genus *Pseudepicausta* Hendel. See Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 64).

Dacus pubiseta Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 294.

The type male is in good condition except for one broken antenna. It is labeled " Moluccas, Bachan, *W. W. Saunders*, B.M. 1868–4 ".

It is an Otitidae in the collection under the genus *Antineura* Osten Sacken. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 41, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 36) has treated it in this combination.

Dacus sepedonoides Walker

1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 228.

The type male is in good condition. It is labeled " Moluccas, Ceram, *W. W. Saunders*, B.M. 1868–4 ". This was described by Walker under his treatment of the species from Waigiou Island and it has been assumed that this was the type locality.

This is an Otitidae belonging in the genus *Lamprophthalma* Portschinsky according to its placement in the British Museum collection. Hendel (1914, *Gen. Ins.* 157) did not list this species. Bezzi (1913, *Mem. Ind. Mus.* **3** : 79), *et al.* considered this to be a *Dacus*.

Dacus sepsoides Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 163.

The type male is in fair condition except that the abdomen is missing. It is labeled " *Moluccas*, Amboina, *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae, in the collection under the genus *Elassogaster* Bigot. *Cephalia bicolor* Bigot and *Stenopterina unimaculatus* Kertesz are listed as synonyms. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 52, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 82) lists it under this combination.

Dacus sexmaculatus Walker

1871, *The Entomologist*, **5** : 344.

Walker described a male from Harkeko, Egypt, but I am unable to find it in the collection, also there is no card for this species in the British Museum file. I presume the type to be lost and the species is unrecognizable from the original description.

Dacus signatipes Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 163.

The type male is in good condition. It is labeled " Ambona [Amboina], *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae, in the collection under the genus *Elassogaster* Bigot. Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 52) listed it under this combination.

Dacus sordidus Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 251.

The type female is in fair condition, the antennae are missing, the apical third of one wing is gone and some debris is scattered over the body. The specimen is labeled " New Guinea, Dory, *W. W. Saunders*, B.M. 1868–4 ". It had not been labeled type but contained Walker's handwritten label " *sordidus* " and is evidently the type.

This is an Otitidae, not classified in the British Museum collection. It belongs in the genus *Elassogaster* Bigot and it appears that *E. varialis* (Walker) is a new synonym. The only difference that I can see in these is that in *varialis* abdominal terga two and four are covered with short white pile while in *sordidus* the terga are covered with dark brown pile. I have not compared enough specimens to know whether or not this is of any significance.

This species was not treated by Hendel (1914, *Gen. Ins.* **157**).

Dacus speculifer Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 122.

The type male is in good condition. It is labeled " New Guinea, *A. R. Wallace*, B.M. 1862–91 ".

This is a new synonym of *Dacus* (*Neodacus*) *curvifer* Walker, see notes under that species.

Dacus squalidus Walker

(Pl. 12, fig. 12)

1860, *Trans. Ent. Soc. Lond. n.s.* **5** : 323.

One specimen is in the collection, it has not been designated as the type but is probably one of the two (♀ and ♂) specimens reported by Walker. It is in poor condition and I cannot even determine the sex ; the abdomen, one wing and some of the legs are missing and the thorax is covered with debris. It is labeled " India, *W. W. Saunders*, B.M. 1868–4 ".

This is a Pyrgotidae, it has not been correctly placed in the collection but appears to fit close to the genus *Campylocera* Macquart. It may possibly belong to this genus, the British Museum has a number of species under *Campylocera* but all are from Africa. The wing is as in Pl. 12, fig. 12.

Dacus strigifer Walker

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 13.

The type (sex?) is in poor condition, the wings and the abdomen are missing. It is labeled " East Indies, Gilolo, *W. W. Saunders*, B.M. 1868–4 ".

It is in the collection under the genus *Antineura* Osten Sacken (Otitidae) and is treated in this combination by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 42, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 37).

Dacus strigifinis Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 295.

Walker indicated a female in his description but the unique specimen in the collection, labeled " *strigifinis* " by Walker, is a male. The pin contains the data " Moluccas, Bachan, Pres. by *Saunders*, B.M. 1868–4 ".

This is a *Dacus* (*Neodacus*) Perkins. *D.* (*Neodacus*) *lanceolatus* (Perkins) (1939, *U. Queensland Pap. Dept. Biol.* **1** (**10**) : 22) is a new synonym, based upon a comparison of the types in the British Museum collection.

Dacus terminifer Walker

(Pl. 12, fig. 13)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 152.

The type female is in rather poor condition, the abdomen and one set of legs are missing. It is labeled " Celebes, Macassar. *W. W. Saunders*, B.M. 1868–4 ".

This is a *Dacus* (*Zeugodacus*) Hendel. It is a small species characterized by the all black face and by the wing markings. No distinct costal band is present, only the stigma (cell Sc) is yellow-brown fumose and an isolated yellow-brown spot is present at the apex of vein $R4 + 5$ (Pl. 12, fig. 13). The yellow mark on the mesopleuron extends along the entire dorsal margin, continuous with the yellow humerus. The postsutural yellow vittae are very short and end at or slightly posterior to the anterior supraalar bristles.

Length : Wing, 4·5 mm.

Dacus trivittatus Walker

1849, *List. Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1072.

The type male is in fair condition, one wing is broken and there is some debris on the body. It is labeled " Philippine Is. purchd. fr. *Mr. Wood*, 45.49 ".

This is an Otitidae, and is in the collection under the genus *Stenopterina* Macquart. This properly belongs in the genus *Plagiostenopterina* Hendel. It has been listed under the combination *Plagiostenopterina trivittata* (Walker) by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 49, and 1914, *K. K. Zool-Bot. Ges. Wien*, **8** (**1**) : 65).

Dacus turgidus Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 134.

The type male is in fair condition except that one wing is lacking. It is labeled only " S. 68.4 ", probably for Salwatty, New Guinea.

A synonym of *Dacus concisus* Walker, now under the combination *Diplochorda concisa* (Walker) in the subfamily Dacinae, tribe Phytalmiini.

Dacus varialis Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 123.

The type female is in good condition except that the head is gone. It is labeled " New Guinea, *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae in the collection under *Elassogaster* Bigot. It is listed under this genus by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 52). *Elassogaster varialis* (Walker) appears to be a new synonym of *E. sordidus* (Walker), see my discussion under that species.

Dasyneura caudata Walker (*nec* Fabricius)

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1073.

Two specimens are present which Walker had determined as " caudata? ". They are labeled " India, N. Bengal, *Lieut. Campbell*, B.M. 1842–25 ". They have also been labeled (evidently not by Walker) " *Dasyneura caudata* Walker " and one of them is marked " type ". This was not described as a new species by Walker, he thought he was describing *caudata* Fabricius.

These are specimens of *Dacus* (*Strumeta*) *cucurbitae* Coquillett.

Dasyneura nebulosa Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1076.

I could not find a *Dasyneura nebulosa* Walker in the collection but did find a *Dacus nebulosus* Walker. This fits Walker's vague description fairly well, as would a great share of all *Dacus* spp. A male specimen is labeled type " bred fr. follicles of *Asclepias pubescens*, Cape Colony, pupa found 26–II–1814, *W. J. Burchell*, 113 ". Two other specimens, bearing the same data, are also present. Walker's specimen of *Dasyneura nebulosa* apparently contained no locality or collector data. I am not certain that this is the specimen which Walker described, *Dacus nebulosus* may be a *nomen nudum*. There is apparently no way to be sure in this case and since *Dasyneura nebulosa* is unrecognizable from the description I believe it best to consider the above specimen of *Dacus nebulosus* as the type.

I have written to Harold Oldroyd about this matter and he replied " the specimens you recorded as *Dacus nebulosa* are believed to be the type material of *Dasyneura nebulosa* Walker, 1849. According to a note in my copy of the ' List ...', this material was transferred to *Dacus* by E. E. Austen on 5.X.1904, and at the same time he entered the locality ' Cape Colony (*W. J. Burchell*) ' in the book ".

This is a new synonym of *Dacus* (*Didacus*) *fuscatus* Wiedemann (1819, *Zool. Mag.* **1** (**3**) : 28). The type, and the two specimens present, are discolored. The scutellum is reddish brown on the disc and rufous around the edge. The bright yellow margin, characteristic of most specimens of *fuscatus*, has been lost due to the discoloration. Cell 1st M2 has a slight hyaline streak through the middle in the type and is more fumose, as in typical *fuscatus*, in the other two specimens.

Dasyneura tau Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1074.

The type male is in good condition. It is labeled " China, Foochow, *G. T. Lay*, ♂, B.M. 1845–65 ".

This is a *Dacus* (*Zeugodacus*) Hendel. *Dacus hageni* de Meijere (1911, *Tijds. v. Ent.* **54** : 375) is a new synonym of *Dacus* (*Zeugodacus*) *tau* (Walker). Other names that will fall into synonymy under *tau* are as follows : *Dacus caudatus* var. *nubilus* Hendel (1912, *Suppl. Ent.* **1** : 16) ; *Zeugodacus caudatus* Perkins (*nec* Fabricius) (1938, *Proc. Roy. Soc. Queensland* **49** (**11**) : 139) ; *Zeugodacus nubilus heinrichi* Hering (1941, *Siruna Seva*, **3** : **11**) and *Zeugodacus bezzianus* Hering (1941, *Arb. uber Morph. u. Tax. Ent.* **8** (**1**) : 26). See Hardy & Adachi (1954, *Pac. Sci.* **8** (**2**) : 188–189).

The type specimen is slightly more pale than is typical for the species (it is either teneral or faded) but obviously fits within the range of variability for this species.

For a description and figures of this species refer to Hardy & Adachi *op. cit.* : 188–191.

Enicoptera arcuosa Walker

(Pl. 12, figs. 14*a*–*b*)

1860, *Jour Proc. Linn. Soc. Lond.* **4** : 156.

Three males and one female are in the collection labeled " Celebes, nr. Macassar, *A. R. Wallace*, B.M. 1858–142 ". None is labeled type but all are obviously cotypes and one of the males is no doubt Walker's type.

This is a Dacinae, tribe Adramini, belonging in the genus *Neosophira* Hendel (new combination). *Neosophira ferruginea* Hendel (1914, *Abh. K. K. Zool.-Bot. Ges. Wien*, **8** (**1**) : 138) is a new synonym, based upon a comparison of Walker's type with Hendel's description and figures (*cf.* Pl. 12, fig. 14*a* with Hendel, 1914, *Gen. Ins.* **157**, pl. 3, fig. 64).

Neosophira arcuosa (Walker) is a well-defined species easily characterized from other *Neosophira* by the wing markings (Pl. 12, fig. 14*a*) as well as by other details. The development of the lower occiput and genae is especially peculiar, in some specimens a slender lobe is developed from the lower portion of the head which may be equal or longer than the third antennal segment ; in other specimens just a slight lobe is developed.

Descriptive Notes Based Upon the Cotype Series

Head : In direct frontal view the head is distinctly wider than long. The front is broader than long ; the superior fronto-orbital bristles are situated at the middle of the front and are almost as strong as the verticals. A black stripe extends down the median portion of the front to just above the lunule, an arm extends out on each side and runs obliquely to the eye margin just in front of the superior fronto-orbital bristles. The face is moderately concave on the lower portion and the epistoma is projected. The face has a large oval spot across the median portion at the lower third, this does not extend as far as the antennal furrows. The antennae are entirely yellow ; the third segment is about three times longer than wide and is rounded at apex. The arista is long plumose. The occiput is strongly inflated below, at its widest point it is approximately two-thirds the width of one eye. As mentioned above the genae are lobate, refer to Pl. 12, fig. 14*b* for the extreme development of the genae in the male specimens at hand. *Thorax :* Entirely rufous except for a large black spot behind each humerus and for a narrow brown to black longitudinal vitta extending from just behind the suture to approximately opposite the postalar bristles, in line with the sides of the scutellum. Each mesopleuron has a narrow vertical, brown stripe near the hind margin. *Wings :* Venation very near that of *distorta.* The apical cell (cell R5) is not so strongly narrowed, however, at the apex it is greater in width than the length of the r-m crossvein. The cubital cell has a comparatively short pointed lobe at apex, it is less than the length of the vertical section of vein Cu1 (Pl. 12, fig. 14*a*). *Abdomen :* Entirely rufous in both sexes. The ovipositor has been broken off the female specimen at hand.

Length : Body and wings, 11·0–12·0 mm.

Enicoptera pictipennis Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 155.

The type male labeled " Celebes, nr. Makassar, *A. R. Wallace*, B.M. 1858–142 " is in poor condition ; the head has been broken off and has been glued to the bottom part of the nadel.

This is a *Neosophira* Hendel, it has been compared with the type of *N. distorta* (Walker) and the synonymy recorded by Hendel (1914, *Gen. Ins.* **157**, *Dipt. Muscaridae*, p. 78, and 1914, *Abh. K. K. Zool.-Bot. Ges. Wien,* **8** (**1**) : 139) has been confirmed.

Enicoptera? plagifera Walker

(Pl. 13, fig. 15)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 156.

Walker indicated that he described a female. The unique male specimen in the collection containing the handwritten label "*plagifera*" and the data "Celebes nr. Makassar, *A. R. Wallace*, B.M. 1858–142" is no doubt the type, Walker was often confused on the sex of his specimens.

This is a Trypetinae belonging in the genus *Seraca* Walker. *Sophira bistriga* Walker (*op. cit.* : 160) is a new synonym, based upon a comparison of the types; Walker's *bistriga* was based upon the female and *plagifera* upon the male. *Colobostrella ruficauda* Hendel (1915, *Ann. Mus. Nat. Hung.* **13** : 429) is also obviously a synonym of *plagifera*, based upon comparisons with the original description and figure; Malloch (1939, *Proc. Linn. Soc. N. S. Wales* **64** (**3–4**) : 446) had suggested that *Colobostrella ruficauda* was possibly a synonym of *Sophira bistriga*. Consequently the genus *Colobostrella* Hendel, based upon *C. ruficauda*, falls as a new synonym of *Seraca* Walker.

S. plagifera is related to *S. extranea* (de Meijere) (1914, *Tijds. v. Ent.* **57** : 193, pl. 5, fig. 7) but the wing markings are distinctly different, as shown in Pl. 13, fig. 15 and in de Meijere's fig. 7 (*loc. cit.*) and the thoracic markings are quite different: *plagifera* has four black spots on the mesonotum, *extranea* has five, etc.

Descriptive Notes Based Upon the Type

Head: With one pair of inferior fronto-orbital bristles situated near the lower fourth of the front and with two pairs of superior fronto-orbitals, the lower pair is situated slightly above the middle of the front, the upper pair is weak and is situated just below a level with the ocelli. No ocellar bristles are present on the specimen at hand and the postvertical bristles are rather weak, they are about equal in size to the outer verticals. The front has a few small hairs scattered above and below the inferior fronto-orbital bristles. The front is about as wide as long, entirely yellow with the bristles as noted above. Face flat, almost straight in profile; entirely subopaque black. The upper portions of the genae are black, the portion adjoining each eye margin is yellow and densely gray pubescent. The occiput is entirely yellow, the lower portion is slightly puffed, at its broadest point it is about one-half as wide as the eye. The antennae are yellow-brown, the third segment is about two and one-half to nearly three times longer than wide and is rounded at apex. The arista is long plumose on both sides, the longest hairs are considerably greater than the width of the third segment. *Thorax:* Predominantly bright yellow to rufous. Presutural, humeral, dorsocentral and prescutellar bristles are present. The dorsocentrals are situated just slightly in front of a line drawn between the postalars. The mesopleura are entirely black except for each upper margin which is yellow. The sternopleura are black except for the upper hind cornes and the hind margins which are narrowly yellow, sternopleural bristles are lacking. The mesonotum has a large black spot behind each humerus extending almost to the suture.

The hind portion of the mesonotum is entirely shining black, and a black vitta extends anteriorly from each side almost to the suture, in line with the dorsocentral bristles. The metanotum is black on the sides and yellow in the middle. The scutellum is entirely yellow, the disc is rather thickly covered with short, suberect, brown to black hairs; it has four strong bristles and one weak pair of secondary bristles. *Legs:* The front coxae and femora are black. The middle femora are predominantly shining black, tinged with rufous on the posterior and dorsal surfaces. The hind femora are dark brown to black ventrally and over apical third, the dorsal portion of the basal two-thirds is yellow. The front tibiae and tarsi are almost entirely black, those of the middle and hind legs are yellow. The front femora each have a row of five to six moderately strong posteroventral bristles extending down the apical third. The mid-tibia has only one strong black spur at apex. *Wings:* As in Pl. 13, fig. 15, with two transverse hyaline marks; the first extending from the costa just beyond apex of vein R1 to just beyond the r-m crossvein; the second (distad) mark extends from near the apex of vein R2 + 3 to vein M4 + 5 just before the m crossvein. The wing is otherwise brown to yellow-brown fumose (the basal two-fifths is predominantly yellow, lightly tinged with brown. The apical portion is predominantly brown), refer to Pl. 13, fig. 15. The setae on vein R1 extend over the node to the humeral crossvein. R4 + 5 is setulose from near the base to the apical fourth of the last section of the vein, the setae are rather sparse. The stem of Rs is bare. Vein R2 + 3 is just slightly undulated, but is gently curved upward so that the fourth costal cell is approximately equal in length to the fifth; the proportions being 55 to 48. The cubital cell has a short, acute point at apex below, approximately equal to the length of the vertical section of vein Cu1. The r-m crossvein is situated distinctly beyond the middle of cell 1st M2, at about the apical three-fifths of the cell. The last section of vein M1 + 2 is about half again longer than the preceding section, the proportions are 39 to 54. The m crossvein is bent outwardly in the median portion. *Abdomen:* The abdominal terga are predominantly black on the sides, yellow down the median portion; the apices of two, three, four, and the apical one-half of five, are entirely yellow. The venter is yellow to rufous.

Length: Body, 9·2 mm.; wings, 8·55 mm.

Enicoptera rufiventris Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5**: 163.

Type male in good condition is in collection from " Moluccas, Amboina, *W. W. Saunders*, B.M. 1868–4 ".

This is a synonym of *Adrama selecta* Walker, see notes under that species.

Enicoptera tortuosa Walker

(Pl. 13, fig. 16)

1860, *Jour. Proc. Linn. Soc. Lond.* **4**: 155.

A male and a female are in the collection labeled " Celebes ", the male labeled " Macassar ", the female labeled " near Macassar " *A. R. Wallace*, B.M. 1868–142 "; both are in good condition. The male specimen is evidently Walker's type.

This species has been correctly placed by Walker but it has received no attention in the literature except for mention by Hering (1938, *Deutsch. Ent. Zeits.* **1938** : 412) along with *E. flava* Macquart as " nicht geklärten Arten ". Hering (1938, *loc. cit.* and 1937, *Phil. Jour. Sci.* **63** (**1**) : 105–108) followed the change of spelling " *Henicoptera* " as used by Loew (1873 *Monogr. Dipt. N. Amer.* **3** : 21). Hendel (1914, *Wien. Ent. Zeit.* **33** : 78) also used this spelling. Loew gave no reason for making this change and I am using the original spelling *Enicoptera,* as did Walker (1860, *loc. cit.*), Osten Sacken (1882, *Berl. Ent. Zeits.* **23** : 232), Malloch (1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 441) *et al.*

E. tortuosa appears to be characterized from other known *Enicoptera* by the predominantly rufous thorax with no black vittae on the mesonotum and by having no black markings on the scutellum.

Descriptive Notes on the Type

Head : Entirely yellow to rufous except for the brown eyes, with no dark markings on the front or the face. Three pairs of moderately strong inferior fronto-orbital bristles and two pairs of superior fronto-orbitals present. Ocellar bristles very weak ; postvertical bristles moderately developed, about equal in size to the superior fronto-orbitals. Front broad, as wide as long. Third antennal segment approximately four times longer than wide and almost equal in length to the face. Arista long plumose, the longest hairs are greater than the width of the third segment. *Thorax :* Predominantly yellow to rufous, with black markings on the front portion of the mesopleura, the major portion of the sternopleura, and the hypopleura. The upper portions of the pteropleura are tinged with brown. The humeri are entirely yellow, each notopleural callus is predominantly so with only its upper border brown. The area between the humerus and the notopleural callus is brown and the area immediately above it, in front of the suture, is brown to black. The hind margin of the mesonotum is also black. There are no prescutellar bristles and one pair of dorsocentrals is developed, these are slightly in front of a line drawn between the inner posterior supraalars. The scutellum is all yellow and has four moderately strong marginal bristles. The metanotum is entirely black except for a faintly rufous mark in the median portion. *Wings :* As in Pl. 13, fig. 16. *Legs :* Entirely yellow to rufous except for the brown to black coxae. *Abdomen :* Rather long and slender, parallel sided. The first tergum and the median portions of the other terga are yellow, the sides are yellow-brown. The second tergum is more distinctly brown in color than are the other. Ovipositor reddish brown, the basal portion, *in situ,* is approximately equal in length to the last four visible abdominal segments.

Length of type male : Wing, 12·8 mm.; body, 14·4 mm. Female : Wing, 11·2 mm.; body, 10·8 mm. (not including ovipositor).

Helomyza optatura Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 116.

The type female, from New Guinea, has been examined and the synonymy with *Themaroides quadrifera* Walker has been confirmed. Bezzi (1913, *Mem. Ind. Mus.*

3 : 76) said Czerny found these to be synonyms when he examined the types in 1904.

Helomyza quadrifera Walker

(Pl. 13, fig. 17)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 246.
Helomyza optatura Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 116.

The types of both of these are in the collection, from New Guinea; Walker described the male as *quadrifera* (he called it a female in his description) and the female as *optatura*. Osten Sacken (1881, *Enumer. Dipt. Malay Arch. Genova*, p. 459) thought these were distinct but as pointed out by Bezzi (1913, *Mem. Ind. Mus.* **3** : 76) Czerny examined the types in 1904 and found them to be synonyms. *Themara ampla* Doleschall *nec* Walker (1859, *Nat. Tijds. Ned. Indie*, **17** : 154) is also a synonym, as was pointed out by Osten Sacken (1882, *Ann. Mus. Civ. Stor. Nat. Genova*, p. 19). Doleschall's species was a *nomen nudum* and would not have priority over *quadrifera*.

This is a Trypetinae and is the type of the genus *Themaroides* Hendel (1914, *Wien. Ent. Zeitung*, **33** : 77). The concepts of this genus need to be clarified somewhat. It was treated by Malloch (1939, *Proc. Linn. Soc. N. S. Wales* **64** (**3–4**) : 416) but does not run well in his key. He keys it in the group which has vein R2 + 3 (2nd vein) undulated; actually vein R2 + 3 is straight or nearly so. The striking generic characters seem to be that the two pairs of inferior fronto-orbitals are situated close together on the lower part of the front and the lower superior fronto-orbital bristle is situated at the lower one-third to one-fourth of the front, very near the inferior fronto-orbitals.

Descriptive Notes Based Upon the Type

Six strong scutellar bristles are present. The entire body is very thickly covered with short black, suberect, setae. *Head:* Entirely yellow, except for the brown eyes. Hendel says the face is strongly convex in profile; actually I would consider it rather gently convex and receding below; the epistomal margin is not at all developed. The third antennal segment is very short, it is scarcely longer than wide and does not extend to the middle of the front. The front measured from lower ocellus to the lunule is about one-third longer than wide. The genal bristles are strongly developed. There are no distinct bristles on the sides of the face or the oral margin. *Legs:* The front femora each have a row of rather strong posteroventral bristles and a row of posterodorsal bristles. The middle and hind femora each have a row of short, black bristles along the anterior surface. The middle tibiae each have a row of four moderately strong posterodorsal bristles near the middle and two strong, equally developed spurs at apex. Thorax entirely rufous. The dorsocentral bristles are situated about halfway between the postalars and anterior supraalars. Wings as in Pl. 13, fig. 17. *Abdomen:* First three terga and median part of fourth yellow to rufous; the remainder black except for a faint spot of rufous in the middle of the fifth. Ovipositor black, the basal segment *in situ* is equal in length to segments five and six.

Length : 9·0–9·5 mm.

One specimen, labeled " Hollandia " is in the Zoological Museum, Amsterdam, determined as " *Rioxa quadrifera* Walk." by de Meijere.

Noeeta latiuscula Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.

The type male is in good condition, except for fungus on the abdomen. It is labeled " Borneo, *W. W. Saunders*, B.M. 1868–4 ".

This is an Otitidae falling in the subfamily Plastotephritinae, genus *Rhegmatosaga* Frey (see Frey, 1930, *Notulae Ent.* **10** : 63 and Frey, 1932, *Ann. Mag. Nat. Hist.* **(10) 9** : 256 for a discussion of the subfamily, in latter and for a description of the genus and type species in the former). *R. insignis* Frey is a new synonym. I have compared the type in the British Museum collection. Frey's description, 1930 *loc. cit.* and Pl. 11, fig. 8 are adequate. *Noeeta latiuscula* Walker was in the British Museum collection as a fruit fly under the genus *Carphotricha* Loew.

Polyara insolita Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 123.

The type apparently is not in the collection. A male and a female are on hand. The female is in poor condition and has a small round label with what appears to be " Mysol " written on it. The male is in good condition and has a label containing what might possibly be a capital M, it also has a handwritten label of Walker's " *insolita* ".

This is the only known species in the genus *Polyara* Walker and is very easily recognized by the peculiar wing venation. Vein R2 + 3 has two spur veins on the underside extending almost to vein R4 + 5 and has one spur vein on the upper side which connects with vein R1. The apical portion of vein M1 + 2 is curved upward, greatly narrowing cell R5. The head is very broad ; in both sexes it is distinctly wider than the thorax. The front measured from the lower ocellus to the lunule is almost twice as wide as long. There are two pairs of superior fronto-orbitals situated on the upper third of the front, and one pair of very weak inferior fronto-orbitals situated near the lower margin of the front. The entire front is covered with short, erect, dark colored hairs. The ocellar bristles are rather small, they are approximately equal in length to the hairs, or bristles, of the occipital row. The face is very broad, in profile it is almost flat and receded below ; the epistoma is not at all produced. The third antennal segment is approximately three to three and one-half times longer than wide ; is gradually tapered toward the apex and is rounded apically. The arista is rather long plumose, the longest hairs are considerably greater than the width of the third segment. Six scutellar bristles are present. The dorsocentrals and prescutellars are well developed. Two pairs of dorsocentrals are present, one is located behind the postalars, just before the scutellum and in line with the basal scutellar bristles, the second pair is just behind a line drawn between the anterior supraalars. The ovipositor is very elongate. The basal portion, *in situ*, is approximately equal in length to the remainder of the abdomen plus the thorax. Malloch (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 417, 418, pl. **11**, fig. 4) has adequately described this genus and species.

Rioxa? bimaculata Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 164.

A synonym of *Ptilona confinis* (Walker). The type is present in the collection from Amboina.

Rioxa confinis Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 132.

The type female, from Sarawak, Borneo, is in fair condition. This species is a Trypetinae, fitting in the tribe Euphrantini and in the genus *Ptilona* van der Wulp.

Ptilona confinis (Walker) is somewhat variable in coloration and wing markings and has apparently been described in the literature under a number of different names. I have confirmed the synonymy of *Trypeta basifascia* Walker (from Macassar) and *Rioxa bimaculata* Walker (from Amboina), based upon a comparison of the types, in the British Museum collection. This synonymy was first reported by Kertész. (See Hendel, 1915, *Ann. Mus. Nat. Hung.* **13** : 446.)

I am also placing *Ptilona armatipes* Hering (1953, *Siruna Seva*, **8** : 4, fig. 4) from Fukien, China, as a new synonymy of *P. confinis* (Walker). The only differences that I can see in these (comparing with Hering's description and figure) is that Hering shows two hyaline marks near the apex of cell 1st M2 ; in Walker's type there is just one. Hering also shows two round marks in the middle of cell M4, in Walker's specimen these are confluent. I feel that these are variable characters and are of no taxonomic value.

I also believe that it is probable that *Ptilona brevicornis* van der Wulp (1880, *Tijds. v. Ent.* **23** : 185, pl. **11**, fig. 7), the type of the genus from Java and *Ptilona nigriventris* Bezzi (1913, *Mem. Ind. Mus.* **3** : 110, pl. VIII, fig. 20), from India are synonyms of *P. confinis*. Both of these have been recorded as widely distributed throughout much of the oriental region and Indonesia. Chen (1948, *Sinensia*, **18** : 84) placed *P. nigriventris* Bezzi in synonymy with *P. brevicornis* van der Wulp and commented that it is a widely distributed, rather variable species and that the coloration differences in the abdomen and wing used by Bezzi were probably individual variations. The variability in the wing pattern of "*nigriventris* Bez." has been discussed by Munro (1935, *Arb. über Phys. und angew. Ent. aus Berlin-Dahlem*, **2** (**3–4**) : 259–260). According to Hendel (1915, *Ann. Mus. Nat. Hung.* **13** : 446) Kertész had labeled specimens of *nigriventris* as "*Rioxa confinis* Walk." Hennig (1941, *Ent. Beihefte aus Berlin-Dahlem*, **8** : 125) says that *P. nigriventris* is possibly a synonym of "*Rioxa confinis* Walk."

One specimen is in the collection, from Mailum, Negros, Phil. Isl., which compares very well with the type of *confinis*.

Rioxa formosipennis Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 252.

A male and a female are in the collection labeled " Dory, New Guinea, 59–58 ". Both contain Walker's handwritten label " *formosipennis* " and are obviously the specimens which Walker had before him. The male should be considered as the type.

This is a Trypetinae and is the type of the genus *Neothemara* Malloch (1939, *Ann. Mag. Nat. Hist. Ser.* **11**, **4** : 253). It is a well-defined species related to *N. multistriga* (Walker) new combination, but is distinguished by having just one hyaline mark through cell R1 and no hyaline mark at the apex of cell R3 (see Malloch, 1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) pl. XI, fig. 10). In *multistriga* cell R1 has two hyaline marks and cell R3 has one. Also the mesonotum of *formosipennis* has a pair of dark stripes down the middle and the scutellum has a black spot on each side. In *multistriga* the mesonotum has two pairs of black spots and the scutellum is all yellow.

Descriptive Notes Based Upon the Type

Head : The front is yellow with a vertical stripe extending the entire length from the ocellar triangle to the front margin. *Thorax :* Predominantly yellow with a pair of black vittae extending down the mesonotum from about halfway between the prescutellar and the dorsocentral bristles to the inner scapular bristles, in line with the prescutellars. Also, a black vitta is present on each side extending from the inner margin of the suture to the hind margin of the mesonotum and extending inwardly to the prescutellar bristles and a narrow stripe is present down each side of the mesonotum from the outer scapular bristles, just above the humerus, extending down over the notopleuron and over the wing base. The pleura are all yellow except for a longitudinal stripe extending from each propleuron to the pteropleuron. The sternopleuron has a black streak along its top margin. The scutellum is yellow with a moderately large black spot on each side of the disc. *Legs :* Entirely yellow except for brownish discolorations at the apices of the hind femora and at the apical under portions of the middle femora. *Wings :* As in Malloch's figure (*loc. cit.*). *Abdomen :* The basal two segments of the abdomen are yellow ; the third and fourth segments are black with the apical one-third to one-fourth yellow. The fifth segment is dark brown to black with a narrow yellow apex. The basal segment of the ovipositor is black ; it is approximately one-third to one-half times longer than the fifth abdominal segment.

Length : Wing, 7·6 mm.

Note : Specimens of *N. formosipennis* were found in the Zoological Museum, Amsterdam, from New Guinea, which had been determined as " *Scholastes cinctus* " by de Meijere. Malloch (1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 434) recorded it from Wewak, New Guinea.

Rioxa lanceolata Walker

(Pl. 13, fig. 18)

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 35, pl. II, fig. 3.

The specimen labeled " type, Singapore, *A. R. Wallace, Saunders* coll. 68.4 " is a male. Walker had indicated a female in his original, this was no doubt an error. The type is in fair condition but most of the bristles have been broken off. Two other specimens are present from Sarawak, Borneo.

This is the type of the genus *Rioxa* Walker. This group has been rather badly confused in the literature and *Rioxa sens. lat.* apparently contains several possible genera. I plan to revise this complex in the near future. Based upon *R. lanceolata* the *Rioxa sens. str.* are differentiated from related groups by having the subcostal vein arcuate and the apex of Sc slanted gradually to the costa. Also by having vein R1 extending almost to apex of vein R2 + 3 (Pl. 13, fig. 18). Walker's fig. (*loc. cit.*) is accurate but the dark coloration on the front margin of the wing has obscured the details of the venation so the above given characters have apparently been overlooked. In Malloch's key (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 416) *R. lanceolata* would fit the first statement in couplet 7 " first wing-vein exceptionally long, ending in the costal vein above level of upper extremity of the outer cross-vein ..." (characteristic of *Cheesmanomyia* Malloch). *R. lanceolata* would not, however, properly run to couplet 7, it runs to couplet 11 (from couplet 6) by having only veins R1 and R4 + 5 partly setulose above. In most respects it is entirely different from *Cheesmanomyia.*

This species is readily differentiated from other *Rioxa* by the wing maculation and venation (Pl. 13, fig. 18).

Descriptive Notes Based Upon the Type

Head : Front approximately as wide as long, with two pairs of inferior fronto-orbital bristles located on the lower fourth of the front and with two pairs of superior fronto-orbitals ; the lower pair is situated slightly below the middle of the front. Face gently concave in profile, with a brown protuberance on each side of the epistome (the upper angle of the gena). *Thorax :* The prescutellar bristles are at, or very slightly behind, a line drawn between the posterior supraalars and the dorsocentrals are slightly behind the anterior supraalars. Six strong scutellar bristles are present. No distinct scapular bristles are present. The mesonotum is yellow with a narrow black vitta extending the full length, in line with the dorsocentral bristles and extending over the sides of the scutellum. The thorax is rather broad, as in other so-called *Rioxa,* not counting the scutellum it is slightly longer than wide. *Wings :* The subcostal vein is bowed upward at about its middle portion and does not curve sharply upward at the apex as in typical Tephritidae ; the apical portion slants obliquely into the costa (Pl. 13, fig. 18). This characteristic certainly would suggest that this not a true fruit fly ; however, the species has all other characteristics of fruit flies, all of the normal bristle, wing characters, etc. of true Tephritidae. Vein

R1 is very elongate, it ends in the costa at a point beyond the m crossvein, very near the apex of vein M3. The fourth section of the costa is not quite half as long as the r-m crossvein (Pl. 13, fig. 18). Vein R1 is setulose throughout its length to the node. Vein R4 + 5 is setulose to its base but the stem of Rs is bare. Vein R4 + 5 curves upward at the extreme apex so that the apical cell of the wing (sixth costal section) is rather broad, it is approximately two times wider than the fifth costal section. The r-m crossvein is situated at about the apical fourth of cell 1st M2. The cubital cell has a short but acute lobe at its apex (Pl. 13, fig. 18). *Abdomen :* Black on the sides and over the entire fifth segment and yellow down the median portion of segments one to four.

Seraca abbreviata Walker

(Pl. 13, figs. 19*a*–*c*)

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 117.

The type female labeled " New Guinea " is in poor condition, the head is gone, some of the legs are missing and the thorax is damaged. Two cotypes containing the same data as the type are in good condition.

This is a *Rioxina* Hering and the type of this genus, *Rioxa de-beauforti* de Meijere (1906, *Nova Guinea Dipt.* **5** (**1**) : 94, fig. 17), is a new synonym of *R. abbreviata* (Walker). The genus is monotypic. The species is readily distinguished from other fruit flies by the wing markings. The entire costal margin and the apical two-fifths of the wing is dark brown fumose, only the posterior basal portion of the wing is yellowish to subhyaline (Pl. 13, fig. 19*c*).

Descriptive Notes on the Type

Head : Two pairs of rather strong fronto-orbital bristles are present, the lower is situated at the middle of the front. There are also two pairs of inferior fronto-orbitals, one strong pair and one rudimentary pair situated immediately below ; the lower bristles are about as strong as the postvertical bristles, which are also rather poorly developed. There are no ocellar bristles on the specimens at hand. Front and face entirely yellow except for a vertical black stripe extending from the epistome up the middle part of the face about two-thirds its length. The middle of the face is gibbose, rather markedly convex. The antennae are rufous to yellow, the third segment is rather small, it is about two times longer than wide and extends scarcely one-fourth the length of the face. The arista is long plumose, the longest hairs are one-half or more the width of the third segment. The occiput is greatly narrowed above, inflated below ; at the widest point it is about equal to half the width of the eye (Pl. 13, fig. 19*a*). The occiput is entirely yellow. *Thorax :* Predominantly yellow, with a median black vitta down the mesonotum from about level with the hind margins of the humeri to the scutellum. The sides of the mesonotum are black. The pleura have two longitudinal black stripes, one extending in line with the propleural spiracle and the other across the upper portion of each sternopleuron. The sternopleural, humeral and presutural bristles are well developed.

The dorsocentral bristles are situated about halfway between the anterior supraalars and the posterior supraalars. Scutellum all yellow, except for the extreme apex, which is brown ; six strong marginal bristles are present and the dorsal surface is rather thickly covered with suberect short black setae. *Legs :* Chiefly yellow, middle and hind femora tinged with brown on their dorsal surfaces. Front femora each with two strong ventral bristles just beyond the middle (Pl. 13, fig. 19*b*). *Wings :* As in Pl. 13, fig. 19*c*. Node of R and stem of Rs bare. *Abdomen :* First three terga yellow except for the brown lateral margins. Terga four and five entirely dark brown to black. Sternum and genitalia yellow to rufous.

Length : Wing, 10·0 mm.; body, 9·2 mm.

Seraca signata Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 165.

The type female is labeled " Mak.", no doubt for Makassar, Celebes. It is in fair condition, the wings are damaged but the details of the venation and coloration are evident. It was in the collection under the genus *Rioxa*.

This species belongs in the genus *Sophira* Walker (new combination) and is related to *S. quadripunctata* Malloch (1939, *Ann. Mag. Nat. Hist.* (**11**) **4** : 255), from the Solomon Islands and is differentiated by having the wings subhyaline, slightly yellowish ; the posterior portion of the wing nearly hyaline and by having the apex of the stigma (cell Sc) brown ; rather than having the wings chiefly yellow, intensely so at base and on anterior portion ; the posterior portion broadly gray-brown fumose and the subcostal cell yellow as in *quadripunctata*. It also differs by having the sixth tergum of the female entirely yellow ; rather than with two black spots on the sixth tergum. *S. signata* is somewhat more slender in build and the ovipositor base is shorter than in *quadripunctata* ; being equal to segment five plus the visible portion of six, rather than equal to segments four plus five. It is also related to *S. holoxantha* Hering (1941, *Siruna Seva,* **3** : 21) but differs by having black spots on the fifth tergum rather than having the abdomen entirely yellow.

S. signata is an almost entirely pale species, except for a black spot on each side of the fifth tergum of the abdomen. The costal and basal cells of the wing are almost hyaline. The r-m crossvein is situated at the apical two-thirds to three-fourths of cell 1st M2. The narrow brown costal band is continuous from just beyond the tip of vein R1 to the apex of vein M1 + 2.

Seraca signifera Walker

(Pl. 14, fig. 20)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 165.

The type male labeled " Celebes " is in fairly good condition. This is the type of the genus *Seraca* Walker.

Colobostrella Hendel (1914, *Wien. Ent. Zeit.* **33** : 79—type of genus, *C. ruficauda* Hendel) and *Zoosina* Hering (1941, *Ann. Mus. Nat. Hung.* **34** : 68—type of genus

Anastrepha extranea de Meijere) are new synonyms of the genus *Seraca* Walker, based upon the study of specimens in the British Museum collection and in the Museums at Leiden and Amsterdam (de Meijere's collection); also *Colobostrella ruficauda* Hendel is a new synonym of *Seraca signifera*. I have also confirmed the synonymy of *Kambangania* de Meijere (1914, *Tijd. v. Ent.* **57** : 196—type of genus, *K. metatarsata* de Meijere), this latter synonym (with *Colobostrella*) was reported by Hendel (1915, *Ann. Mus. Nat. Hung.* **13** : 428). Malloch (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 445) questioned this synonymy.

This species is readily distinguished from other known *Seraca* by the dark coloration of the body, the presence of only two longitudinal vittae on the mesonotum and by the wing pattern as shown in Pl. 14, fig. 20.

Descriptive Notes Based Upon the Type

Head : Predominantly yellow, except for the eyes and the upper occiput and vertex which are reddish brown. The strong pair of superior fronto-orbital bristles is placed at the middle of the front, a tiny rudimentary pair is situated above these. The front is almost as wide as long, measured from the lower ocellus to the lunule. The face is nearly straight in profile but from a direct frontal view the median upper three-fourths is raised into a keel. At the lower one-fourth of the face is a slight transverse depression, the portion extending below this to the epistoma is flat. From a lateral view the occiput is rather strongly narrowed above and inflated on the lower portion, at its broadest point it is over half as wide as the eye. *Thorax :* Yellow-brown with two submedian black vittae extending the entire length of the dorsum, in line with the dorsocentral bristles. The notopleura are dark brown to black. The upper margins of the mesopleura are brown ; the pleura are otherwise not marked with brown to black. The dorsocentral bristles are located rather close to a line drawn between the inner supraalars. Wings as in Pl. 14, fig. 20. Vein R1 is haired to its base. The node of R has setae only to the humeral crossvein and R4 + 5 is setulose to its base. The stem of Rs is bare. Vein R2 + 3 is slightly undulated as shown in Pl. 14, fig. 20. Cubital cell with a rather short, acutely pointed lobe at apex, the lobe is about equal in length to the vertical portion of Cu1. *Abdomen:* Largely subshining black on the sides of the terga and yellow to rufous down the median portions of terga one to four. Fifth tergum all black. The sternum is entirely yellow to rufous. The genitalia are black.

Length : Wing, 8·75 mm.

Soita psiloides Walker

(Pl. 14, figs. 21*a–b*)

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 136.

The type male is in the collection in fair condition except that one wing and some bristles are broken off. It is labeled only with an " S. " (probably for Salwatty) on a small round card plus Walker's handwritten label "*psiloides*". This is the type of the genus *Soita* Walker (*op. cit.*, p. 135). In Malloch's key (1939, *Proc. Linn. Soc. N. S. Wales*, **64** : 441) it runs best to couplet 9, with the genus *Ichneumonosoma* de Meijere. There are, however, a few hairs on the pleurotergite so it runs imperfectly past couplet 2. It is obviously quite a different genus from *Ichneumonosoma*. That group lacks sternopleural and prescutellar bristles and has but one pair of inferior fronto-orbital bristles and one superior fronto-orbital ; also the ocellar bristles are absent. *Soita* have sternopleurals and prescutellars ; also a tiny pair of ocellar bristles and two pairs of superior fronto-orbitals.

Based upon the type the generic characters of *Soita* are as follows : *Thorax :* Long and slender, mesonotum about two times longer than wide. The sternum is densely setose, thickly covered with short to rather elongate, yellow-brown hairs and bristles. Only two scutellar bristles are present, these are obviously very long and strong (they are broken from the specimen at hand but I presume they would be equal in size to the inner posterior supraalar bristles). The pleurotergite has a few conspicuous hairs, about four or five situated on the lower portion. In this regard it would key out in the tribe Euphrantini but I question its relationship to this group. It would be best to modify Malloch's key to handle those genera with but two scutellar bristles (*Ichneumonosoma* and *Soita*) in couplet 2. The prescutellars, outer postalars, the mesopleural and sternopleural bristles are yellow-brown ; the other main bristles of the thorax are black. The dorsocentral pair is very strong and is situated just behind the suture, approximately in line with the notopleural bristles ; the dorsocentral and the sternopleurals are approximately two-thirds as long as the mesonotum. The scutellars and possibly also the humerals and the presuturals may also be very strongly developed (they are broken on this specimen). *Head* : Rather peculiarly shaped, the vertex is very flat, not at all developed and not visible in direct lateral view. One pair of inferior fronto-orbital bristles is developed on the lower third of the front. There are two pairs of superior fronto-orbitals, the lower is at the middle of the front and is very flat, broad, and strap-like (the bristle is broken from one side and the apex of the other bristle is broken) ; it is apparently longer than the front and is equal in width to about two-fifths the width of the third antennal segment (Pl. 14, fig. 21*a*). The ocellar bristles are rudimentary, very tiny. The third antennal segment is three and one-half to four times longer than wide and is longer than the face. The arista is short plumose. *Legs :* The front femur has a row of five or six rather strong, yellow-brown posteroventral bristles and two moderately developed yellow-brown posterior bristles just below the middle. The middle femur has two rather strong, black preapical bristles on the posterior surface. The middle tibia has a row of strong, black posterodorsal bristles and a ring of three strong, black bristles and two brown, moderately developed bristles at the apex. The hind femur has five rather weak, yellow-brown, anterodorsal bristles on the apical two-fifths. The hind tibia has a row of moderately developed, brown, anterodorsal bristles and one black, rather weak, ventral bristle at the apex. *Wings :* As in Pl. 14, fig. 21*b*, with vein R_1 setulose from just below the humeral crossvein. Vein $R_{4} + 5$ is entirely setulose, the stem of Rs is bare. The base of vein Cu_1 and vein $M_1 + 2$, from the r-m crossvein, is rather strongly setulose to approximately two-thirds the distance to the m crossvein. The cubital cell has a short, acute lobe at apex below (Pl. 14, fig. 21*b*). *Abdomen :* The sterna of the abdomen are densely covered with short, recumbent yellow-brown hairs as are the terga, and two black bristles are situated near the apex of each sternum. The fifth tergum obviously has a row of very strong black bristles around its apex (these are broken from the specimen at hand). Abdomen long, slender and straight sided, in the type the segments are considerably longer than wide ; the fifth tergum is nearly two times longer than its greatest width.

Specific characters : In addition to the above, the species is entirely yellow to rufous with no dark markings except for the brown eyes and the brown ocellar triangle. The apex of the third antennal segment and the tips of the palpi are tinged with brown. The wings are faintly yellowish fumose. The subcostal cell is yellow, tinged with brown. There is also a brownish fumose spot at the lower apex of cell 1st M2 covering the lower portion of the m crossvein and the tip of vein M3 + 4. The fourth costal section is two times longer than the fifth and the r-m crossvein is situated near the middle of cell 1st M2 (Pl. 14, fig. 21*b*).

Length : Wing, 8·0 mm.; body, 10·0 mm.

Sophira bipars Walker

(Pl. 14, fig. 22)

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 23.

Walker indicated a female in his description but the unique specimen in the collection is a male labeled " *bipars* " in Walker's handwriting. It is from " Moluccas, Ceram." This is probably the type, Walker may have been confused regarding the sex. The specimen is in good condition.

This belongs to the genus *Hemilea* Loew (new combination) and is closely related to *H. praestans* (Bezzi) (1913, *Mem. Ind. Mus.* **3** : 141, pl. X, fig. 51) from India. The only difference which I can find is that in *bipars* the brown marking of the wing fills up nearly all of cell 1st M2 and about half of cell 2nd M2 ; rather than these cells being mostly hyaline as shown in Bezzi's figure (*loc. cit.*). Bezzi figures and describes two hyaline streaks along the costa just beyond vein R1. *S. bipars* has only a small hyaline spot just beyond the apex of R1 (Pl. 14, fig. 22). Bezzi also said that the sides of all of the abdominal segments, except the last, are " broadly reddish "; in *bipars* the last three terga are entirely shining black and the basal two terga are rufous. *S. bipars* differs from *H. dimidiata* (Costa) (1837, *Atti Accad. Sci. Napoli*, **4** : 12, pl. 1, fig. 7) by lacking the brown fasciae (five) down the mesonotum. It is also slightly larger in size and the base of the abdomen is all rufous rather than being largely black and rufous only on the sides.

In addition to the above the head (except for the eyes), antennae, entire thorax and legs are rufous to yellow. The venter of the abdomen is entirely yellow. The wings are as in Pl. 14, fig. 22.

Length : Wings, 6·0 mm. × 2 mm. at the widest point ; body, 5·2 mm.

Sophira bistriga Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 160.

A female specimen labeled " Celebes, Makassar " and containing Walker's handwritten label " *bistriga* " is apparently the type.

This belongs in the genus *Seraca* Walker and is a new synonym of *S. plagifera* (Walker).

Sophira concinna Walker

(Pl. 14, figs. 23*a–c*)

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 132.

Walker indicated a female in his original description but the specimen in the collection labeled " Borneo, *W. W. Saunders*, B.M. 1868–4 " is a male. It is not labeled type but has Walker's handwritten label " *concinna* ".

This fits the concept of the genus *Seraca* Walker in most respects and is probably best treated under this name until the concept can be further clarified. Hering (1952, *Treubia*, **21** (**2**) : 271) treated this as a *Colobostrella*. The sternopleural bristle is well developed, almost as strong as the humeral and because of this it will not fit Malloch's concept of this genus (as *Colobostrella*, 1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 441) but would run to *Gastrozona* Bezzi ; it differs considerably from the latter genus. It may be necessary to erect a new genus or subgenus for *concinna* and possibly other related species.

Descriptive Notes on the British Museum Specimen

Head : As in Pl. 14, fig. 23*a*, as seen from lateral view. One pair of inferior fronto-orbital and two pairs of distinct superior fronto-orbital bristles are present. Front also with a row of ten or more fine, pale brown hairs (most of these very short) extending down each side in line with the inferior fronto-orbital bristle. *Thorax :* Predominantly yellow with four brown stripes extending longitudinally down the mesonotum. The pleura each have a broad brown vertical stripe extending from each side of the mesonotum between the humerus and notopleural callus over the mesopleuron to the sternopleuron, expanding to cover the entire sternopleuron and the hypopleuron. The presutural bristle is rather small, it is about equal in size to the posthumeral bristle. The pleurotergite is bare. *Legs :* The front femur has no hairs or bristles on the under portion. The middle basitarsus is curved and the proportions of the segments of the tarsus, as seen from dorsal view, are as in Pl. 14, fig. 23*b*. *Wings :* Predominantly brown except for a hyaline transverse stripe across the middle and except for a hyaline mark extending longitudinally from the wing base through cell M, the base of 1st M2 and to the wing apex through middle of cell M4 ; this becomes somewhat fumose near the wing margin (Pl. 14, fig. 23*c*). Vein R2 + 3 has one undulation in the median portion. The fifth costal section is about two-thirds as long as the fourth, the proportions are 37 to 56. The r-m crossvein is situated slightly before the middle of cell 1st M2. The proportions of the last section of vein M1 + 2 to the preceding section is about 33 to 45. *Abdomen :* Yellow, with four broad brown vittae, one on each side, and two submedian, extending the full length.

Sophira distorta Walker

(Pl. 14, figs. 24*a–b*)

1857, *Trans. Ent. Soc. Lond. n.s.* **4** : 230.

The type male is labeled " Celebes, Mdme Pfeiffer, B.M. 1855–22 ". It is in rather poor condition, the head has been partially eaten away. A female specimen in the collection labeled " Celebes, Menado, Mdme I. Pfeiffer, B.M. 1855–22 " is in good condition.

This is the type of the genus *Neosophira* Hendel and *Enicoptera pictipennis* Walker (1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 155) is a synonym.

Descriptive Notes Based Upon the Type

A large, predominantly yellow to rufous species with black markings only on the front and face. *Head :* The front is as broad as long and has a broad, black stripe extending down the middle from the vertex to the lunule. One pair of moderately small, superior fronto-orbital bristles is developed, these are about equal in size to the small bristle on the hind portion of the mesopleuron. The face is slightly convex on the upper portion and is rather deeply concave at about the lower third, with the epistoma strongly projecting (Pl. 14, fig. 24*a*). The median portion of the face (the area of the concavity) has a transverse black mark extending into the sides of the antennal furrows. Only one pair of bristles is present on the back of the head, these are the inner verticals ; the outer verticals and postverticals are lacking. There are no ocellar bristles on the specimens at hand. The upper occiput, behind the eyes, has a row of rather fine, brownish hairs ; no distinct bristles are developed in this occipital row. There are no genal bristles developed and no bristles are present along the sides of the oral margin. The genae are approximately one-third the height of the eye. The first antennal segment is yellow, the second is yellow except for the black dorsal surface. The third segment is yellow basally and brown to black toward the apical portion, it is about two and one-half to nearly three times longer than wide and is rounded at apex. The arista is long, plumose, the longest hairs are considerably greater than the width of the third segment. *Thorax :* With no prescutellar, dorsocentral, humeral, presutural, sternopleural or pteropleural bristles. The pleurotergite is bare. The mesonotum and scutellum are densely covered with fine, suberect, brown hairs. The scutellum has four marginal bristles. *Legs :* The hind two pairs of femora are long and slender, they are approximately equal in length to the combined lengths of the first four abdominal segments. The legs are completely unarmed, with no bristles, except at the apices of the middle tibiae. Each middle tibia has one long and one short apical spur. *Wings :* With very characteristic venation (Pl. 14, fig. 24*b*). The subcostal vein slopes gently into the costa. Vein R1 is very elongate and reaches the costa at a point considerably beyond a level with the m crossvein. Vein R2 + 3 is undulate, it has one upward curve at about the middle. The last section of vein M1 + 2 is rather sharply curved upward toward apex, greatly narrowing the apical cell. The r-m crossvein is situated near the apical one-fourth to two-thirds of cell 1st M2. The cubital cell has a narrow, sharply pointed, lobe at apex, this is longer than the vertical section of vein Cu1. Vein R1 is setulose from the humeral crossvein approximately to its tip. The other veins are bare except for about eight to ten setae along the basal portion of vein R4 + 5. The wing markings are as in the Pl. 14, fig. 24*b*. *Abdomen:* Entirely rufous in female and with terga two to four discolored with black in the median portions in the male. The abdomen is densely covered with suberect fine yellow to brownish pile. The ovipositor is yellow, the basal segment (in the specimen at hand) is almost equal to the length of terga three to five.

Length: Body of both sexes 14·4 mm.; wings of male, 14·8 mm.; wings of female, 15·7 mm.

Sophira punctifera Walker

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 15.

The female specimen is not marked type but has the Walker handwritten label "*punctifera*" and "Moluccas, Gilolo". It is probably the specimen which Walker described.

This belongs in the genus *Hexacinia* Hendel. *Hexacinia multipunctata* Malloch (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 438, pl. 11, fig. 13) is a new synonym. Enderlein (1911, *Zool. Jahrb.* **13** (**3**) : 433) treated *Sophira punctifera* Walker as a synonym of *Acinia stellata* Macquart, 1851 (this name is preoccupied and *radiosa* Rondani must be used). This synonymy is not correct.

Malloch's description, and figure, of this species (as *multipunctata*) are adequate. It is distinguished from other known *Hexacinia* by having three hyaline spots along the wing margin in cell R1 and by having only the extreme apex of cell R5 hyaline.

Sophira venusta Walker

(Pl. 15, fig. 25)

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 35.

Two female specimens are in the collection, neither is marked type but one from "Singapore, *W. W. Saunders*, B.M. 1868–4" has Walker's handwritten label "*venusta*" and is probably the type. The other specimen is labeled "Molucca, *A. R. Wallace*, B.M. 1855–9".

This is the type of the genus *Sophira* Walker and is distinguished from other known species by having four longitudinal brown streaks on the wings (Pl. 15, fig. 25).

The genus *Sophira* has been characterized by the presence of six scutellar bristles and by the lack of a sternopleural bristle. This can be slightly misleading, the genotype has small, rudimentary, secondary scutellars. These are easily overlooked and if the bristles are broken off the bases may be difficult to discern. Shiraki (1933, *Mem. Fac. Sci. Agric. Taihoku Imp. Univ.* **8** (**2**) : 320) characterizes the genus as having all yellow bristles and " having three very oblique bands " in the wings. The type of the genus has all black bristles except for the secondary scutellars which are pale yellow and the wings lack oblique bands. Shiraki's diagnosis pertains to the genus *Tritaeniopteron* de Meijere ; I have published a review of the genera *Sophira* and *Tritaeniopteron* see Hardy, 1957, *Proc. Haw. ent. Soc.* 16(3) : 366-378.

Descriptive Notes Based on the Type

Wings : Predominantly yellow fumose with a brown band extending from end of subcostal vein, filling all of cell Sc, and extending along the costa about halfway through the apex of cell R3. A narrow brown streak also extends over veins R4 + 5, M1 + 2, and M3 + 4, as in Pl. 15, fig. 25. *Thorax* and *abdomen :* Predominantly yellow. The pleura each have a vertical stripe of black extending from the lower part of the sternopleuron to the upper margin of the mesopleuron ; this extends onto the mesonotum at the suture. The mesonotum also has a narrow black stripe on each side, in line with the outer scapular bristles, extending as far as the anterior supraalar bristles. Behind the dorsocentral bristles the mesonotum is black. The first abdominal tergum is yellow. The second has a black transverse band near its base. The third and fourth terga each have a moon-shaped black band extending across the basal margin in the middle and curving posteriorly toward the posterior lateral margins of the segment. The fifth tergum has an oblique black stripe on each side, extending from the posterolateral margin to the base of the segment.

Strumeta concisa Walker

(Pl. 15, figs. 26*a–b*)

1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 227.

Walker indicated a female in the original description but the unique specimen in the collection bearing the handwritten label " *concisa* " is a male. It is from " Dutch East Indies, Waigeu Is., *W. W. Saunders*, B.M. 1868–4 " and is in good condition except that some bristles are lost. This specimen is very probably the type.

I have placed *Strumeta* Walker as a subgenus under *Dacus* Fabricius (Hardy, 1955, *Ann. Ent. Soc. Amer.* **48** (**6**) : 436) and the species name is preoccupied by *Dacus concisus* Walker (1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 252).

Strumeta concisa apparently belongs to an undescribed genus and I am herein proposing the generic name *Curvinervus* n. gen. and am changing the species name to *walkeri*.

This is a Trypetinae with a very characteristic wing venation and I am unable to place it in any of the known genera. In Malloch's key (1939, *Proc. Linn. Soc. N. S.*

Wales, **64 (3–4)** : 415 and 441) it fits in group III by having four scutellar bristles and it runs, very imperfectly, in the first part of couplet 7 to *Enicoptera* Macquart. It shows no actual relation to this group, however, and is radically different. Vein R2 + 3 (second vein) has three upward loops rather than one, it is not fused with vein R1 and has a strong appendix on the upper side of the third loop (Pl. 15, fig. 26*b*). It also differs from *Enicoptera* by having the fourth costal section (cell R1) slightly longer than the fifth section (cell R3), rather than not over one-fifth as long ; the apical cell (cell R5) is expanded at the wing margin, rather than strongly narrowed and the section of vein M1 + 2 before the r-m crossvein is nearly straight, rather than strongly bent downward (*cf.* with Pl. 13, fig. 16).

Description of the Species Based Upon the Walker Specimen

Head : The front, measured from the lower ocellus to the lunule, is as wide as long. One pair of incurved, rather small, inferior fronto-orbital bristles is situated at the upper fourth of the front ; on one side a rather weak secondary superior fronto-orbital bristle is developed, it is about equal in size to the ocellar bristles. The ocellars are comparatively weak. The face is entirely yellow with no dark markings and is moderately concave in profile. The occiput is rather swollen at the lower portion, at its broadest point it is almost one-half as wide as the eye. The front is rather thickly covered with rather long hairs, these are almost as strong as the ocellar bristles and from a lateral view this may give the impression that there are numerous inferior fronto-orbital hairs (Pl. 15, fig. 26*a*) ; many of these are in the area directly above the inferior fronto-orbitals but are equally scattered across the middle portion of the front. The antennae are yellow, the third is tinged with brown. The third segment is rather broad and is rounded at the apex, it is slightly less than two times longer than wide. The arista is short plumose, the longest hairs are less than half the width of the third segment. *Thorax :* Chiefly yellow, tinged with brown on the mesonotum behind the humeri, and extending over the notopleural calli ; also the hind portion of the mesonotum is brown. The presutural bristles are lacking. The humeral bristle is rather weak, not quite as long as the inferior fronto-orbitals. The pteropleural and sternopleural bristles are rather weak, are brown to yellow in color and about equal in size to the inferior fronto-orbitals. The scutellum is yellow and has four bristles, it also has a tiny, pale-colored seta on each side in the position of the secondary scutellars. The metanotum is dark brown, tinged with yellow in the median portion. The pleurotergite is bare. The entire pleura and legs are clear yellow. *Legs :* The middle tibia has a single strong spur at the apex. The femora are all very slender and are armed with some slender pale hairs, but no bristles, beneath. *Wings :* Predominantly brown fumose with four small hyaline spots along the anterior margin of the costa, with another round hyaline spot near the upper middle of cell R5, with a narrow transverse hyaline mark extending from the end of the subcostal vein to the basal part of M4 + 5, and also with some hyaline markings along the posterior border of the wing. Venation and coloration as in Pl. 15, fig. 26*b*. Vein R2 + 3 is very strongly undulated and has an appendix on the upper side of the vein. R1 is setulose only to the humeral crossvein. The stem of Rs is bare. The apical portion of the cubital cell is developed into a narrow acutely pointed lobe. This is slightly longer than the vertical portion of vein Cu1. Cu1 + 1st A curves downward slightly on its course to the wing margin. The wing is comparatively long and slender, almost three times longer than wide. *Abdomen :* Basal two segments entirely clear yellow, the base of the third segment is narrowly yellow. The abdomen is otherwise polished black on the dorsum, yellow on the venter.

Length : Wing, 6·0 mm.

Strumeta conformis Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 34.

No type had been designated but a female specimen, in good condition, labeled " *conformis* " in Walker's handwriting is apparently the type. It is from " Singapore, *W. W. Saunders*, B.M. 1868–4 ".

This is the type of Walker's genus *Strumeta* which I treat as a subgenus of *Dacus* (Hardy 1955, *Ann. Ent. Soc. Amer.* **48** (**6**) : 436) and *conformis* is a synonym of *Dacus* (*Strumeta*) *umbrosus* Fabricius (Hardy & Adachi, 1954, *Pac. Sci.* **8** (**2**) : 184).

Strumeta helomyzoides Walker

1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 220.

One male specimen is in the collection labeled " Moluccas, Misol* Is.", it is not labeled type but is probably the male specimen which Walker described. The specimen is in good condition.

This is a Trypetinae belonging in the genus *Themarohystris* Hendel. *T. erinaceus* Hendel (1914, *Ann. Mus. Nat. Hung.* **13** : 433), the type of the genus, is a new synonym of *T. helomyzoides* (Walker). Based upon the comparison of Walker's type with Hendel's description and with specimens in the British Museum collection ; refer to Hendel (*loc. cit.*) and to Malloch (1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 422) for descriptive details of this species.

Strumeta repleta Walker

(Pl. 15, fig. 27)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 296.

The type had not been designated but a female specimen with the handwritten label " *repleta* " from " New Guinea, Bachan†, *A. R. Wallace*, B.M. 1858–142 " is obviously the type.

This is a Trypetinae belonging in the genus *Neothemara* Malloch (new combination). It belongs in the group which have vein Cu1 setulose before the downward curve and seems to fit closest to *N. exul* (Curran) (1936, *Proc. Cal. Acad. Sci.* **22** (**1**) : 27) but the wing maculation is very different (*cf.* Pl. 15, fig. 27 with Malloch, 1939, *Ann. Mag. Nat. Hist.* (**11**) **4** : 254, pl. XI, fig. 15), and the legs are predominantly black rather than rufous.

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* Misspelling for Mysol.

† Misspelling for Batchian.

Descriptive Notes Based Upon the Type

Thorax : Predominantly yellow with a pair of black stripes extending longitudinally from the inner scapular bristles to about a level with the dorsocentral bristles, in line with the scapulars. Another longitudinal stripe is present on each side, beginning just behind the suture and extending to the hind margin, in line with the lateral margins of the scutellum and continuing as a black line across the hind margin of the mesonotum. Also a short black longitudinal stripe is present on each side, extending from the presutural bristle to the front margin of the thorax just above the humerus, and another short, black stripe extends across the notopleural callus to the wing base. The pleura have a narrow black longitudinal vitta from each propleuron extending to the middle of the pteropleuron, this is interrupted slightly at the hind margin of the mesopleuron ; the black portion on the pteropleuron is just a spot. The upper half to two-fifths of each sternopleuron is also black. The scutellum is all yellow except for a narrow black band across the base. The metanotum is black. *Legs :* The femora are all brown to black except for a yellow streak down the dorsum and except for rather narrow yellow apices. The tibiae and tarsi are entirely yellow. *Abdomen :* The first two terga are entirely yellow ; the third is chiefly black with a narrow yellow base and a narrow yellow apex. The fourth tergum is broadly yellow at the base and apex ; brown on the sides and with two brown spots near the middle. The fifth tergum is yellow at the base and apex, with two spots in the middle which are narrowly joined at the center and on the sides to the brown spots covering the lateral margins. The ovipositor is black, the basal portion, *in situ*, is approximately equal in length to segments four and five.

Length : Wing, 6·4 mm.

Themara ampla Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 33, pl. 1, fig. 5.

The type male is labeled " Singapore, ex coll. *W. W. Saunders*, 68–4 " and is in fair condition. Four other specimens are in the collection from Borneo and Sumatra.

This is the type of the genus *Themara* Walker and as pointed out by Walker (*op. cit.*, p. 134) the species is a synonym of *Achias maculipennis* Westwood (1848, *Cab. Orient. Ent.* p. 38, pl. 18, fig. 4).

This fits the concept of *Themara* proposed by Hendel (1928, *Ent. Mitt.* **17** (**5**) : 355) except that he said the pteropleural bristle is lacking ; in the type species this bristle is rather well developed. Hendel places considerable generic importance upon the presence or absence of setae along vein M3 + 4 and the portion of vein Cu before the downward curve (collectively spoken of as Cu by Hendel and 5th vein by Malloch *et al.*). Malloch does not use this as a generic character (for *Themara*) but separates *Themara* from *Neothemara* Malloch by having just one pair of inferior fronto-orbital bristles and by having the secondary scutellars short and the radial sector bare. The latter is not correct, setae are present on the Rs in the type species. The first character might also be misleading since the type of *T. ampla* (and some other specimens) has two pairs of inferior fronto-orbitals placed close together on the lower one-fourth of the front ; one of these is rather weakly developed and this is apparently abnormal, other specimens I have examined have but one pair. Malloch also indicated that the mesopleural hairs are much stronger in *Neothemara* than in *Themara* ; I see no differences in these hairs in comparing the types of both genera. The best characters which I see for separating *Themara* from *Neothemara* are the following : in *Themara* the lower superior fronto-orbital bristles are situated slightly below the middle of the front, while in *Neothemara* they are situated distinctly above the middle. *Themara* normally has but one distinct inferior fronto-orbital bristle, only four strong scutellars, vein R2 + 3 is distinctly undulate and M3 + 4 and the straight basal section of Cu are setulose. In *Neothemara* two well-developed inferior fronto-orbitals and six strong scutellars are present, vein R2 + 3 is but slightly curved and veins M3 + 4 and the base of Cu are setulose only in *N. exul* (Curran) and *N. repleta* (Walker).

The very broad head (stalked eyes) of the male is probably one of the distinctive characters of *T. maculipennis* although the extent of development of the sides of the head varies considerably in different individuals. From the wings I see no way to differentiate *T. microcephalus* Hering (1938, *VII Intern. Kongr. für Ent.* **1** : 175) ; Hering said, however, that the head of the male is not widened in that species.

Descriptive Notes Based Upon the Type of T. ampla *Walker*

Head : The aristae are long plumose. The secondary inferior fronto-orbital bristles lie close to and are much smaller than are the principal bristles. The front, measured from the lower ocellus to the lunule, is distinctly wider than long. The ocellar bristles are very weak, hairlike. The face is somewhat receded below. The epistoma is not at all produced. *Thorax :* Entirely rufous except for a black spot on the hind portion of the mesonotum, in front of the scutellum. The hind margin of the scutellum is also blackened and the metanotum is predominantly dark brown to black. The scutellum has four strong marginal bristles and a pair of weak secondary bristles. *Wings :* Walker's fig. 5, pl. 1, is ample for the wing markings. Vein R1 is setulose just to its base, there are no setae on the node. The radial sector is setulose and R4 + 5 has setae almost to its apex. Vein M3 + 4 is setulose almost to its apex and the basal portion of vein Cu1 has setulae to the point where it meets the m-cu crossvein. Vein R2 + 3 is rather strongly undulated and bends upward on its apical portion so that the fifth costal section is almost as long as the fourth. The r-m crossvein is situated approximately at the apical one-fifth of cell 1st M2. The cubital cell has a sharp pointed, rather slender, apical lobe below. This is slightly longer than the vertical section of vein Cu1. *Abdomen :* The first tergum is entirely yellow. The base and apex of the second and the apex of the third are yellow, the remainder of the terga are black. The venter is entirely yellow to rufous. Ovipositor yellow. The basal segment, *in situ*, is just slightly longer than the fifth abdominal tergum.

Length : Wing, 8·8 mm.; body, 8·4 mm.

Trypeta alvea Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1027.

The type male is in poor condition, it was listed by Walker as being from " Australia, from the Rev. J. Wenham's collection ". The locality is obviously an error, this is a synonym of *Eurosta comma* Wiedemann from the United States.

Trypeta amplipennis Walker

(Pl. 15, fig. 28)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 159.

The type female, labeled " Celebes, Macassar, *W. W. Saunders*, B.M. 1868–4 " is in fairly good condition except that the wings are partially broken.

This is a Tephritinae belonging in the genus *Platensina* Enderlein (see Munro, 1947, *Mem. Ent. Soc. So. Afr.* **1** : 216). *P. amplipennis* (Walker) is very close to *P. malaita* Curran (*P. dubia* Malloch is a synonym of *malaita*), the only differences which I find are in the pattern of the spots in the wings and these are obviously quite variable. The basal cells are completely yellow-brown fumose in *amplipennis* and are hyaline in *malaita*. In *amplipennis* the subcostal cell is entirely dark colored and the hyaline spots over the wing differ as shown by comparing Pl. 15, fig. 28 with fig. 1 of Curran (1936, *Proc. Calif. Acad. Sci. 4th ser.* **22** (**1**), plate 1).

In addition to the above notes : *Thorax :* Gray pollinose with three rather distinct, pale brown, longitudinal vittae extending down the middle, one central and two in line with the dorsocentral bristles. The pleura are rufous in ground color. *Legs :* Entirely rufous. *Wings :* As above and as in Pl. 15, fig. 28. *Abdomen :* Polished black, faintly rufous on the sides of the first tergum. Ovipositor shining black, the basal portion, *in situ*, is about equal in length to the last three visible abdominal segments.

Length : Wing, 5·4 mm.; width of wing, at broadest point, 2·8 mm.

I have compared the types of *Platensina* Enderlein, 1911 (*sumbana* Enderlein) and *Tephrostola* Bezzi, 1913 (*acrostacta* Wiedemann) and have confirmed the synonymy of these genera (see Shiraki 1933, *Mem. Fac. Sci. Agric. Taihoku Imp. Univ.* **8** (**2**) : 386).

Trypeta antiqua Walker

1852, *Ins. Saunders.* **1** (**4**) : 378.

The type is not in the British Museum collection. Two specimens from Mesopotamia are here under the name *Trupanea antiqua* (Walker), determined by " G. A. K. M." Walker's type was from the East Indies. I cannot be sure that these are correctly identified. I am unable to place Walker's species except to say that it is no doubt a Tephritinae. Bezzi (1913, *Mem. Ind. Mus.* **3** : 67) said *antiqua* Walker " is said to be an *Ensina*, and probably belongs to that genus or to *Trypanea* ".

The specimens in the collection do fit Walker's description but that, of course, is very vague and is inconclusive. The specimens at hand are characterized by the very faint yellow-brown markings in the wing, consisting of a more or less continuous series of spot-like marks extending from the costa at apex of cell R1 to vein M1 + 2, about two-fifths the distance beyond the m crossvein and back up to the costa near the middle of cell R1. A spot is present at the top and at the bottom of the m crossvein, another extends across the r-m cross vein, and another faint spot extends through cell R1 directly beneath the apical portion of the subcostal cell. Also, a very faint spot is situated on vein M3 + 4 at its apical three-fifths. The subcostal cell is faintly yellow hyaline, yellow-brown at its apex. The first and second costal cells are completely hyaline as is the remainder of the wing except for the mentioned spots.

Trypeta approximans Walker

(Pl. 15, figs. 29*a*–*b*)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 160.

Walker indicated only a female specimen in his original description but the specimen labeled type is a male from " Celebes, Macassar, *A. R. Wallace*, B.M. 1858–142 ". A female from the same locality is also present labeled " *W. W. Saunders*, B.M. 1868–4 ". Both are in poor condition largely due to the way they are pinned, the nadel obscures most of the characters of the mesonotum.

This species is in the collection under the genus *Acidia* Robineau-Desvoidy but apparently represents an aberrant Tephritinae and seems to belong to an undescribed genus. I am proposing the name *Curticella* n. gen. for *approximans* Walker.

I am unable to place this in any genus known to me. It seems to best fit in the Tephritinae because the front is covered with the flat, squamose, white hairs typical of members of this subfamily and under high magnification the bristles of the occipital row are much thicker than is normal in other subfamilies ; these bristles are all black, however, not pale colored as in typical Tephritinae. *Curticella* apparently is most closely related to *Tephrella* Bezzi and would run here in Malloch's key (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 455). It differs from *Tephrella* in a number of important respects : All of the head bristles are black, those of the occipital row are short and thick ; the ocellar bristles are very weak, hairlike ; the third antennal segment is rather long and slender, four or five times longer than wide and extends almost to the oral margin. The arista is short, but distinctly, pubescent. The genae are about one-third as high as the eye (Pl. 15, fig. 29*a*). The subcostal vein enters the costa at a point about opposite the basal fourth of cell 1st M2 so that the third costal section (cell Sc) is extremely short, about one-sixth as long as second section, and vein R2 + 3 slants upward rather sharply so that the fifth costal section is about as long as the fourth and nearly two times longer than the sixth (Pl. 15, fig. 29*b*). In *Tephrella* (which I have examined) at least some of the head bristles are yellow, those of the occipital row are entirely yellow. The ocellar bristles are very strong, extending nearly two-thirds the length of the front. The third antennal segment is short and rounded, it is scarcely one and one-half times longer than wide. The arista is bare. The genae are narrow. The third costal section is distinctly more than half as long as the second. Vein R1 enters the costa at a point about opposite the middle of cell 1st M2. The fifth costal section is about one-half as long as the fourth and is scarcely longer than the sixth.

Description Based Upon the Type

Head : From direct frontal view it is just slightly wider than long. In profile it is nearly two times higher than long (Pl. 15, fig. 29*a*). The front is about one-third longer than wide, is reddish, tinged with brown in the central portion and is black along the orbits, the vertex, and in front of the ocellar triangle ; the sides are rather densely gray pubescent from a point about opposite the lower superior fronto-orbital bristles. Three pairs of inferior fronto-orbitals and two pairs of superior fronto-orbitals are present ; these are moderately weak, not well developed. The face is straight in profile, it is dark brown to black in ground color and rather densely gray pubescent. The occiput is shining dark brown, the lower portion is expanded and is approximately half the width of the eye (Pl. 15, fig. 29*a*). The antennae are brown. *Thorax :* Shining black. The mesonotum and the sternum for the most part are completely obscured by the nadel. There are obviously two pairs of dorso-central bristles present, the anterior pair is situated approximately in line with the anterior supraalar bristles. Only the two basal bristles are developed on the scutellum. The halteres are entirely yellow. *Legs :* The femora are dark brown to black. The tibiae and tarsi, except for the brown apical subsegments of the hind two pairs, are entirely yellow. *Wings :* As described above and as shown in Pl. 15, fig. 29*b*. The r-m crossvein is situated near the apex of cell 1st M2. The wings have one hyaline mark extending from the costa through the second costal cell ; two hyaline wedge-shaped marks from costa extending through cell R1 ; a round hyaline dot in cell R5 just beyond the m crossvein ; another hyaline dot in cell 1st M2, approximately beneath the m crossvein and three hyaline streaks from the margin, one extending through cell second M2 near the hind margin to the m crossvein, and two streaks through the apex of cell M4 ; cell M4 also has a small hyaline dot at its base. The posterior lobes of the wing are subhyaline. *Abdomen :* Entirely shining black. In the female the sixth abdominal segment is almost as long as the fifth. The ovipositor is polished black, the basal segment is almost equal in length to the segments three to six.

Length : Body and wings, 2·6 mm.

Trypeta atilia Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1021.

The type male from " China, Foochow ", is in good condition.

This is a Trypetinae belonging to the genus *Sphaeniscus* Becker. It is a synonym of *S. sexmaculatus* (Bezzi) and I have treated this as an Oriental and Pacific subspecies under the combination *Sphaeniscus sexmaculatus atilia* (Walker). See Hardy (1955, *Pac. Sci.* **9** (**1**) : 78) and Hardy & Adachi (1956, *Ins. Micronesia,* **14** (**1**) : 20) for descriptions and figures of this subspecies. *Trypeta melaleuca* Walker (1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 238) is a synonym. The synonymy was first reported by Osten Sacken (1881, *Ann. Mus. Civ. Stor. Nat. Genova,* **16** : 459), see also Hardy (*loc. cit.*) for other synonymy.

Trypeta basalis Walker

1852, *Ins. Saunders.* **4** : 380.

The type, from Brazil, is in the collection under *Trypeta.* This is a Tephritinae apparently belonging in the genus *Xanthaciura* Hendel. Hendel (1914, *Abh. Ber. K. Zool. Anthrop. Mus. Dresden,* **14** : 46) and Aczél (1949, *Acta Zool. Lilloana,* **7** : 254) both list this under the combination *Xanthaciura* ? *basalis* (Walker).

Trypeta basalis Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 120.

The type male is from Aru Island. This is an Otitidae and belongs in the genus *Rivellia* Robineau-Desvoidy. The name *basalis* is preoccupied by *Trypeta basalis* Walker (1852, *Ins. Saunders.* **4** : 380), from Brazil and I am proposing the name *Rivellia distobasalis* n. name for this species from Aru.

This species seems to be closely related to *R. radiata* Hendel. It differs by having the legs predominantly yellow, rather than entirely dark brown to black ; by having the hyaline mark in the second costal cell extending across the wing to vein M1 + 2, rather than extending only through the base of cell R1 ; also by having the hyaline mark at the basal portion of the subcostal cell extending transversely through the wing, beyond the confines of the brown markings, to vein M3 + 4, rather than this mark extending just to vein R4 + 5. In *radiata* cells R, M and the basal half of cell 1st M2 are entirely brown.

Trypeta basifascia Walker

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 158.

The type female from " Makessar " is in fair condition. This species belongs in the genus *Ptilona* van der Wulp and is a synonym of *P. confinis* (Walker).

Trypeta cluana Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1019.

The specimen labeled type " Australia, Pres. by the Ent. Club, B.M. 1844–12 " is a female. Walker indicated a male and a female in his original description, I cannot find the male specimen in the collection. A. N. Burns has informed me that a specimen is in the National Museum of Victoria from New South Wales, this may be Walker's male.

This is an Otitidae and is in the collection under the genus *Celetor* Loew and is placed as a synonym of *C. caerulea* (Macquart) (1846, *Dipt. Exot., Suppl.* **1** : 212, pl. 18, fig. 15). The above synonymy was recorded by Hendel (1914, *Abh. K. K. Zool.-Bot. Ges. Wien,* **8** (**1**) : 247).

Trypeta contraria Walker

(Pl. 15, fig. 30)

1852, *Ins. Saunders.* **4** : 385, pl. VIII, fig. 7.

The type male is in the collection labeled " India, *W. W. Saunders,* B.M. 1868–4 ". The original description said the type was from the " East Indies ". It is in very poor condition, the body and wings are covered with debris and the majority of the bristles are broken off. It is extremely difficult to see the important details and I cannot definitely place this to genus. In Bezzi's key (1913, *Mem. Ind. Mus.* **3** : 90) it seems to fit his concept of *Acidia* Robineau-Desvoidy but his concept, is in large part, obviously erroneous. I have compared it with the type of the genus *Acidia* (*cognata* Wiedemann) and it definitely does not fit in this genus. There are no propleural bristles or strong hairs developed as in *Acidia* and it appears that a sternopleural bristle is present ; *Acidia* lacks sternopleurals.

Descriptive Notes on the Type

Head : Front broad, about equal in width to its length. There appear to be three pairs of inferior fronto-orbital bristles and two pairs of superior fronto-orbitals. The anterior superior fronto-orbital is situated near the upper two-fifths of the front. The ocellar area of the head is damaged and I cannot check the ocellar bristles. The bristles of the occiput are apparently all black. The face is slightly raised down the median portion and is vertical in lateral view ; the epistoma is not projecting. Head entirely yellow to rufous except for the reddish brown eyes. The eyes are oval in shape, slightly higher than long. The antennae are yellow to rufous, the third segment is about two times longer than wide and is rounded at apex. The arista appears to be pubescent. It is covered with debris, and the hairs could have been rubbed off. *Thorax :* Entirely rufous with black bristles and with an abundance of black recumbent hairs over the mesonotum. The humeral, presutural and sternopleural bristles are well developed. The scutellum has four strong bristles, there is no evidence of a secondary pair. *Legs :* Entirely yellow to rufous. Front femur with three black bristles on the underside near the apex, two of these are slightly longer than the greatest width of the femur. *Wings :* Predominantly brown, with two wedge-shaped hyaline marks from about the middle of the costal margin ; one starts at the costa just beyond the apex of vein R1 and extends as a narrow triangle through the radial cells into the apical fourth of cell 1st M2 ; the second begins at the costa at about the middle of cell R3 and extends just beyond vein R4 + 5. There is also a small hyaline spot at the wing apex in cell 2nd M2. Vein

R1 is setulose to a level opposite the humeral crossvein. Vein R4 + 5 has about six short black setae at its base just beyond the fork; it has just one black bristle beyond this point, this is situated just before the r-m crossvein. Vein R2 + 3 is straight, or nearly so. The cubital cell has a very short lobe at apex below, its length is much less than the length of the vertical portion of the vein Cu1 (Pl. 15, fig. 30). *Abdomen:* Yellow to rufous on the basal segments with brown discolorations extending over the apical two terga. This is interrupted by yellow down the middle line and on the extreme lateral margins. The venter of the abdomen is entirely yellow. The genitalia are all yellow.

Length: Wing, 6·8 mm.

Trypeta cylindrica Walker

1852, *Ins. Saunders.* **4**: 380.

The original description says the type was from the " East Indies ", the specimen marked " type " in the British Museum collection is labeled " India, *W. W. Saunders*, B.M. 1868–4 ". It is in very poor condition.

This is an Otitidae but I am unable to place it to genus, I find nothing like it in the collection. The species has completely hyaline wings and yellow legs. The thorax and abdomen are predominantly shining blue-black. The scutellum and halteres are yellow. The humeri each have a yellow streak through the middle. The upper portion of each sternopleuron has a yellow spot. The legs are entirely yellow. The head is chiefly yellow, the back part of the occiput is polished black and the front has a brown streak down each side. The face has a median brown to black spot below. The first two antennal segments are black; the third is yellow, is approximately two times longer than wide and is rounded at the apex. The thorax is rather densely covered with recumbent white pile. The wings are so covered with debris that it is very difficult to follow the venation.

Length: Body, 5·25 mm.

Trypeta dertona Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4**: 1027.

The type female is in poor condition and contains no locality or collector labels. This is a synonym of *Eurosta comma* (Wiedemann), from the United States.

Trypeta doclea Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4**: 1035.

The type female, labeled " Australia,? collector " is in good condition.

This is an Otitidae belonging in the subfamily Platystominae and fitting in the genus *Pogonortalis* Hendel. *P. barbifera* Hendel (1914, *Abh. Zool.-Bot. Ges. Wien*, **8**: 144) is a synonym of *P. doclea* (Walker). I have compared Walker's type with a series of *Pogonortalis barbifera* determined by Hendel from Sydney, N. S. Wales and from several localities in Queensland and they compare perfectly. See Malloch (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**1–2**) : 120) for the synonymy.

Trypeta dorsiguttata Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 119.

The type male is labeled " East Indies, Aru Island, *A. R. Wallace*, ex coll. *W. W. Saunders*, 1868–4 ". It is in fair condition except that one wing is missing.

This is a Lauxaniidae apparently belonging in the genus *Sapromyza* Fallén. *Platystoma basale* Walker (1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 148), from " Makessar ", is a new synonym based upon a comparison of the types.

Trypeta elimia Walker

(Pl. 15, fig. 31)

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1033.

The type female is in poor condition, it is covered with fungus and debris. It is labeled " Philippine Islands, Purch. of *Woods*, B.M. 1845–49 ".

Walker described this as a *Trypeta* belonging in his group *Anomoia*. *Anomoia* Walker has been badly confused in the literature and no clear concept of this group has been proposed to date. I have made a rather detailed study of *Anomoia* and related genera and am preparing a revision which should clarify the generic concepts. In light of my study I would place the species in question under the new combination *Anomoia* (*Euleia*) *elimia* (Walker). This is a synonym of *Anomoia* (*Euleia*) *fossata* (Fabricius) (1805, *Syst. Antl.*, p. 320, as *Tephritis fossatus*). See Shiraki (1933, *Mem. Fac. Sci. Agric. Taihoku Imp. Univ.* **8** (**2**) : 169). This fits my concept of *Hendelina* Hardy (change of name for *Pseudopheniscus* Hendel—this will be a new synonym of *Anomoia* (*Euleia*) Walker). In my key to the known Pacific species (Hardy, 1951, *Pac. Sci.* **5** (**2**) : 179–180) it runs to couplet 2 and would separate at this point by having the first two costal cells of the wing predominantly hyaline and by having an oblique streak extending through cell R5. It is a rather small predominantly subshining black species. The front is entire yellow, measured from the lower ocellus to the lunule it is slightly more than one-half longer than wide. There are three pairs of inferior fronto-orbital bristles and two pairs of superior fronto-orbitals. The face is entirely yellow. The antennae are yellow, the third segment appears to be slightly tinged with brown (the coloration is mostly obscured by the fungus growth). The thorax, scutellum, and halteres are entirely black. The legs are predominantly brown. The abdomen is entirely subshining black. The ovipositor is black, the basal segment, *in situ*, is about two-thirds as long as the fifth abdominal segment. Wings with a brown streak extending out along vein Cu1 + 1st A almost to the wing margin (Pl. 15, fig. 31).

Length : Body and wings, 3·6 mm.

Osten Sacken (1882, *Deutsche Ent. Zeits.* **26** : 227) said " *Ortalis regularis* Dol. 3 Bijdr. 47 (Amboina) is the same species ". I cannot confirm this.

Trypeta ferruginea Walker

1852, *Ins. Saunders.* **1** (**4**) : 387.

The original description said the species was described from the " East Indies ". The type female is in the collection labeled " India *W. W. Saunders*, B.M. 1868–4 ". It is in fairly good condition.

This is a Pyrgotidae and apparently belongs to the genus *Tephritopyrgota* Hendel (new combination) ; this does not seem to fit any species which I can find in the British Museum collection.

Descriptive Notes Based Upon the Type

A moderately large almost entirely rufous species. *Head :* All yellow to rufous with no brown to black spots. The upper portions of the occiput are indistinctly colored with brown. *Thorax :* With four moderately strong marginal bristles on the scutellum, plus the numerous hairs on the disc. Just two pairs of dorsocentral bristles are developed, these are situated rather close together near the hind portion of the mesonotum ; the hind pair of bristles is situated slightly in front of a line between the postalars and they are about equal in size to the postalars and to the scutellar bristles ; the front pair of dorsocentrals is rather small, more hairlike, not more than two times longer than the longest hairs on the mesonotum. The mesonotum is predominantly red, tinged with brown and has three median, yellow, longitudinal vittae extending the full length. The humeri and the front margin of the mesonotum are also yellow and a yellow spot is situated on the sides just above the anterior supraalar bristle and behind the suture. *Wings :* Predominantly dark fumose, rather indistinctly spotted with hyaline marks. A rather broad hyaline mark extends from the costa just beyond the apex of vein R1 to vein M1 + 2. The spot extends rather indistinctly through most of cell 1st M2 but is discolored with irregular pale brownish spots. The ovipositor is longer than the entire abdomen.

Length : Body, excluding ovipositor, 9·2 mm.; ovipositor, 3·2 mm.

Trypeta impleta Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 120.

The type female is present from Aru Island. This is a Lauxaniidae apparently belonging to the genus *Sapromyza* Fallén.

Trypeta lativentris Walker

(Pl. 16, fig. 32)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 158.

The type male is in fairly good condition. It is labeled " Celebes, Macassar, *W. W. Saunders*, B.M. 1868–4 ".

This is a Trypetinae belonging to the genus *Xarnuta* Walker. It is related to *X. morosa* de Meijere (1914, *Tijds. v. Ent.* **57** : 198, pl. 5, fig. 10), but differs by having the costal cells dark brown fumose (not with second cell largely hyaline) ; by having no hyaline streak through the middle of the wing inside the r-m and m crossveins, and the other wing markings are quite different (compare Pl. 16, fig. 32 and de Meijere's fig. 10). Vein R2 + 3 is wavy in *lativentris* and in de Meijere's figure of *morosa* it is straight. The r-m crossvein in *lativentris* is situated at the apical third of cell 1st M2, not before the middle of the cell and the wing is also narrower, more pointed.

Descriptive Notes Based Upon the Type

Head : The front is rather narrow, it is slightly more than two times longer than wide and has three rather strong, downcurved, inferior fronto-orbital bristles and two pairs of superior fronto-orbitals. The front and face are entirely yellow, the former is tinged slightly with brown. The genae are discolored with brown. The antennae are yellow, tinged with reddish brown, the third segment is slightly more than twice as long as wide and extends over half the length of the face. The arista is very short plumose, the longest hairs are not more than one-fourth the width of the third antennal segment. *Thorax :* Predominantly subshining brown to black. The humeri, upper front margins of sternopleura, the hypopleura and the lateral margins of the mesonotum, from the suture to the sides of the scutellum, are yellow. Eight strong scutellar bristles are present and the disc is densely covered with short, recumbent setae. The scutellum is predominantly yellow, faintly brownish tinged on the dorsum. *Wings :* As in Pl. 16, fig. 32, almost completely brown. The costal cells are brown and are densely covered with microtrichia. The radial vein is setulose almost to the base of the wing. The stem of the radial sector is bare. Vein R2 + 3 is moderately undulate. *Abdomen :* Short and broad, scarcely longer than wide. It is almost entirely rufous with brownish discolorations in the middle of the terga. The lateral margins are densely covered with moderately strong, black bristles and hairs.

Length : Wing, 5·5 mm.; body, 6·0 mm.

Trypeta lutescens Walker

1857, *Trans. Ent. Soc. Lond.* **4** : 41.

The type is labeled " Amazon, Brazil ". This is a new synonym of *Hexachaeta eximia* (Wiedemann) (1830, *Auss. Zweifl. Ins.* **2** : 477) based upon examination of specimens in the British Museum collection.

Trypeta melaleuca Walker

1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 238.

The type male is labeled " Ceram, E. Indies, *W. W. Saunders*, 1868–4 " and is in good condition.

This is a synonym of *Sphaeniscus sexmaculatus atilia* (Walker), see under *Trypeta atilia* Walker.

Trypeta multistriga Walker

(Pl. 16, fig. 33)

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 119.

The type female labeled " East Indies, Aru Island, *W. W. Saunders*, B.M. 1868–4 " is in poor condition ; the head is missing.

This apparently belongs in the genus *Neothemara* Malloch (new combination), it fits Malloch's concept (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 433) by having the radial sector setose (stem of the second and third vein). Except for this character it would fit fairly close to *Rioxa* Walker and *Acanthoneura* Macquart. *Neothemara multistriga* (Walker) is related to *N. formosipennis* (Walker) but differs by having two hyaline spots in cell R1 and one in cell R3 (Pl. 16, fig. 33, *cf.* Malloch, *loc. cit.*, fig. 10) ; by having two pairs of brown to black spots on the mesonotum, between the presutural and scapular bristles, rather than with a pair of dark stripes and by having the scutellum all yellow, rather than with a black spot on each side.

Descriptive Notes on the Type

Thorax : Very distinctly marked, principally yellow, with the following brown to black marks : two small submedian spots situated behind the inner scapular bristles ; a short black stripe extending over the lower portion of each notopleuron ; a narrow brown stripe situated above the wing base extending from the suture to the anterior corner of the thorax ; a moderately large submedian spot on each side behind the suture and a narrow longitudinal black stripe beginning at the level of the anterior supraalar bristle and extending on a line with the dorsocentral bristle to the hind margin of the mesonotum where it is extended along the margin. *Wings :* As in Pl. 16, fig. 33. Vein R2 + 3 is just slightly undulated.

Trypeta mutyca Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1036.

The type male is in good condition, it is labeled " East Indies, Moulmein, Purch. from *Archdeacon Clerk*, B.M. 1843–431 ".

This has been placed in the genus *Rioxa* Walker by Bezzi (1913, *Mem. Ind. Mus.* **3** : 112) ; it properly belongs, however, in *Acanthoneura* Macquart (new combination) and is a new synonym of *Acanthoneura vaga* Wiedemann (1830, *Auss. Zweifl. Ins.* **2** : 490) based upon a study of specimens in the British Museum collection.

This is a predominantly yellow species. The abdomen is brown with the apices and anterior median portions of terga one to three broadly yellow, the yellow marking of the first segment extends longitudinally down the middle of the abdomen to the apex of the third. For the wing pattern see Bezzi, *loc. cit.*, figs. 22–23.

Trypeta nigrifascia Walker

(Pl. 16, fig. 34)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 158.

The type male labeled " Celebes Makessar, *W. W. Saunders*, B.M. 1868–4 " is in fair condition.

This belongs in the genus *Carpophthorella* Hendel (new combination) and is related to *C. magnifica* Hendel, from Formosa. It differs by having the legs all rufous and the thorax rufous except for the black hind margins of the mesonotum ; rather than having the middle and hind femora brown on their apical portions and the thorax shining black.

Descriptive Notes Based Upon the Type

Head : Front nearly two times longer than wide with six rather strong black inferior fronto-orbital bristles and two superior fronto-orbitals. Head entirely yellow except for the eyes. Arista long plumose, the hairs are much longer than the width of the third antennal segment ; the third segment is about three times longer than wide and is rounded at apex. *Thorax :* Almost entirely rufous. Mesonotum with a broad, shining black, band across the hind portion and covered with short yellow hairs, the bristles are all black. The pleura are entirely yellow to rufous with no dark markings. The scutellum is yellow and the metanotum is black. *Legs :* Entirely yellow. *Wings :* As in Pl. 16, fig. 34. The basal portion of the radial cell is haired slightly in front of the humeral crossvein. The radial sector is bare. The costal margin has a hyaline spot at the middle of cell R1 and another at the middle of cell R3. Vein R4 + 5 is strongly bent upward in the middle between the r-m crossvein and the apex (Pl. 16, fig. 34). The cubital cell has a rather long lobe at the lower apex, this is approximately three times the length of the vertical section of vein Cu1. *Abdomen :* Entirely rufous with no dark markings, rather thickly covered with recumbent, short yellow to rufous hairs and with a clump of black bristle-like hairs on the lateral margins of the second tergum and a few scattered bristles at the sides of the other terga.

Length : Wings, 6·4 mm.; body, 6·0 mm.

Trypeta poenia Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1025.

The type female is in fair condition, one wing is missing. It is labeled " Australia, ? collector ".

This is a Tephritinae belonging in the genus *Tephritis* Latreille (new combination). *Tephritis pelia* Schiner (1868, *Reise Novara, Zool.* **2**, 1 *abt.*, *B. Diptera*, p. 271) is a new synonym. Based upon a study of material in the British Museum collection. For a rather complete description and wing figure (as *T. pelia*) refer to Malloch

(1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 461–462, pl. XI, fig. 24). Walker's type fits this description in all details.

Trypeta pornia Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1039.

The type female is in poor condition, it is badly rubbed, most of the bristles are gone and a portion of the thorax has been damaged by the nadel. It is labeled just " [18] 44 : 105 ". According to the original description this specimen was from " Port Stephen, New Holland " (Australia).

This is a *Rioxa* Walker *sens. lat.* and is the subgenotype of *Rioxa* (*Dirioxa*) Hendel. I have confirmed the synonymy of *Trypeta musae* Froggatt (1899, *Agr. Gaz. N. S. Wales*, **10** : 501) by comparison of specimens in the British Museum collection. The *Rioxa* complex has been badly confused in the literature and needs revision. From the studies I have made towards this end it is obvious that *Dirioxa* Hendel is a good genus, quite distinct from *Rioxa*. It actually fits much closer to *Acanthoneura* Macquart and is differentiated by having two pairs of inferior fronto-orbital bristles, rather than one ; by having the disc of the scutellum entirely bare, rather than with at least a few short hairs on the sides and by having the arista haired only on the top edge, rather than being plumose.

In view of my findings I am treating this species under the new combination *Dirioxa pornia* (Walker).

Descriptive Notes Based Upon the Type

Head : Besides the two pairs of inferior fronto-orbital bristles there are two pairs of superior fronto-orbitals, all are moderately strong. The lowest superior is situated just above the middle of the front, the upper inferior is situated just below the middle. The ocellar bristles are small, rather hairlike. The front is straight on the upper two-thirds, as seen in direct lateral view ; the lower portion is moderately produced into a small bump on each side above the oral margin. The oral margin is also slightly produced. The occiput is moderately swollen below, at its broadest point it is about half as wide as the eye. There are no strong bristles on the sides of the face, only a few short, inconspicuous hairs. The genal bristles are about the size of those in the occipital row. The third antennal segment is slightly less than two times longer than wide and is rounded at apex. The under portion of the arista is bare except for a few short, pubescent-like hairs near the base ; the upper portion is long haired. *Thorax :* Two pairs of dorsocentral bristles are present ; the hind pair is rather weak and is situated near the hind margin of the mesonotum in line with the prescutellar bristles ; the front pair is situated about halfway between the anterior and posterior supraalars. The mesopleura each have two bristles on the hind margin. The pleurotergite is bare. The mesonotum is rather thickly covered with short, recumbent, dark colored setae but the scutellum is entirely bare except for the six marginal bristles ; the intermediate pair is about as strong as the inner postalars. *Legs :* The front femur has a row of three moderately strong bristles on the posteroventral surface at apical third. The middle tibia has just one strong black apical spur. *Wings :* Vein R1 enters the costa at a point approximately opposite the r-m crossvein. The third section of the costa is approximately two-thirds as long as the second. The r-m crossvein is situated at the apical two-thirds of cell 1st M2. The fourth section of the costa is two times longer than the fifth. The cubital cell has a moderately developed, pointed lobe at apex below, this is slightly longer than the vertical section of vein Cu1. Vein R1 is setulose to its base, the node is entirely bare. Vein R4 + 5 is setulose to its base. The radial sector is bare. The other veins are devoid of setae. Vein R2 + 3 is entirely straight. For further details and for drawings of the wings and the ovipositor see Hardy (1951, *Pac. Sci.* **5** : 185).

Trypeta retorta Walker

1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 16.

The type female is in good condition. It is labeled " East Indies, Gilolo, *W. W. Saunders,* B.M. 1868–4 ".

This species belongs in the genus *Carpophthorella* Hendel (new combination) and is apparently related to *C. setifrons* Malloch because of the more numerous inferior fronto-orbital bristles (eight pairs) and the uniformly brown costal margin of the wing, with no hyaline marks before the apex of vein R2 + 3. It differs from *setifrons* by having the middle and hind femora chiefly brown to black, rather than all rufous ; by having the thorax predominantly black, rather than rufous ; by having the first two abdominal terga yellow, in the female, and the other terga all black, rather than having all terga black on the sides and hind margins and otherwise rufous ; also it differs by having the ovipositor equal in length to abdominal segments three to five inclusive, rather than equal to segment four plus five.

Carpophthorella magnifica Hendel (1915, *Ann. Mus. Nat. Hung.* **13** : 449) is obviously very close to, if not the same as, *retorta.* The differences seem rather trivial and may be of no value. *C. magnifica* seems to differ by having only six to seven pairs of inferior fronto-orbital bristles rather than eight pairs and by having the brown marking on the costal margin not so intense and with a hyaline spot present just beyond the apex of vein R1 and another indistinct spot in cell R3 (Hendel, *loc. cit.,* pl. IX, fig. 15).

Descriptive Notes Based Upon the Type

Head : Front nearly two times longer than wide with eight black inferior fronto-orbital bristles. Head entirely yellow except for some brown discolorations at the upper portion of the occiput behind the upper corner of the eyes. *Thorax :* Mesonotum chiefly shining black, with a black median portion, triangular in shape, extending to the front margin between the inner scapular bristles. The front portion and the portion between the black central mark and the sides are yellow-red tinged with brown. The humeri are yellow. The notopleura are black. The mesonotum is covered with short, black hairs ; the bristles are all black. The humeri and the pleura are chiefly pale pilose, the former have a few short black hairs on the upper portions. The propleura and the upper three-fifths of the mesopleura, the hypopleura and the pleurotergites are yellow ; the remainder of the pleura are brown. The metanotum is dark brown to black with two rufous spots. *Wings :* Almost identical with those of *C. setifrons* Malloch (1939, *Ann. Mag. Nat. Hist.* (**11**) **4** : pl. XI, fig. 21). The wings are also very similar to those of *C. nigrifascia* (Walker, 1860) but are much darker colored and the pale areas along the costa are indistinct. It is possible that these details are insignificant and *nigrifascia* may be the male of *retorta*. *Legs :* The entire front legs and all tibiae and tarsi are yellow to rufous. The front femora are rather thickly bristled, they have a row of rather strong yellow bristles on the ventral surface with a few black bristles intermixed and have scattered black bristles intermixed with a few yellow-brown ones around the lateral and dorsal surfaces. The mid and hind femora are almost entirely dark brown to black with two rows of black and brown bristles intermixed extending over the ventral surface. *Abdomen :* Entirely black except for the first two terga which are yellow with a narrow black posterior border on the second. The ovipositor is black ; the basal portion *in situ* is equal in length to terga three to five.

Length : Wings, 7·25 mm.

Trypeta roripennis Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 131.

The type female is in very poor condition, the head, abdomen and most of the legs have been broken off and the wings are bent downward so that it is difficult to see all of the details. The type is labeled " East Indies, Aru Island, *W. W. Saunders*, B.M. 1868–4 ".

This is a Lauxaniidae which I cannot place to genus because so many of the structural details are missing. It is probably a *Sapromyza* Fallén, although I can find but two dorsocentral bristles. It is somewhat like *Sapromyza cirrhicauda* Bezzi as figured by Bezzi (1928, *Dipt. of the Fiji Islands*, p. 130). The wing is dark brown, densely covered with small yellow to hyaline spots, rather evenly scattered over the entire wing surface and in the following arrangement : Cell R1 contains 9 spots ; cell R3 about 22 spots ; the basal section of cell R5 before the r-m crossvein contains 3 pale spots and the apical portion contains 17 ; cell 1st M2 contains about 12 pale spots ; second M2 has 5 and cell M4 has 8 distinct spots. The apical portion of cell R5 is entirely clear (a hyaline mark extends over the narrow apical margin). The thorax is almost entirely dark brown with the anterior median portion of the mesonotum rufous, lightly tinged with brown ; this pattern extends out at the sides into a brown spot behind each humerus, and extends posteriorly a short distance toward the suture. On this specimen I find but two pairs of dorsocentral bristles and one pair of prescutellar bristles. The scutellum has four strong marginal bristles and the disc is densely covered with short, black recumbent setae. The humeri are yellow rufous in ground color, lightly tinged with brown. The sides of the metanotum are rather faintly tinged with yellow to rufous. The pleurotergite and metanotum are brownish yellow. The legs which are present are all brown to black except for the yellow-white tarsi.

Length : Wing, 4·8 mm.

Trypeta rudis Walker

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.

The type female labeled " Borneo, *W. W. Saunders*, B.M. 1868–4 " is in very poor condition. The wings are missing, the thorax is damaged by the nadel and the entire body is covered with debris.

This is a Trypetinae belonging in the Euphrantini and apparently fitting in *Euphranta* (*Staurella*) Bezzi (new combination), I cannot be positive of this placement, however, because of the poor condition of the specimen. The following details would seem to fit it under my concept of the above group. The head has one pair of superior fronto-orbital bristles situated at upper third of the front and two pairs of inferior fronto-orbitals, the upper pair situated fairly close to the superiors. The pleurotergite is covered with fine, pale hairs. Prescutellar bristles are present. The dorsocentrals are situated slightly behind a line drawn between the anterior supraalars. The humeral and sternopleural bristles are present but there is no presutural bristle.

In addition to the above characters :

Head : Front about one-half longer than wide, and slightly discolored with brown in the median portion. The face is entirely yellow and distinctly concave from lateral view. The first two antennal segments are yellow, tinged with brown. The third is yellow and is approximately four times longer than wide, almost equal in length to the face. The arista is plumose, the longest hairs are nearly equal to the width of the third antennal segment. All head bristles are black. The genal bristle is very strong, it is equal in size to the inferior and superior fronto-orbitals. Occiput dark brown to black except on the upper median portion. Vertex entirely yellow. *Thorax :* Predominantly dark brown to black with a yellow mark beginning on the upper third of the mesopleura and extending onto the mesonotum over the suture, these marks extend approximately one-third the distance across the mesonotum on each side. Mesonotum also with a yellow spot on each side just in front of the prescutellar bristle. (This may be a continuous yellow spot, the thorax is damaged at this place.) Scutellum with four strong marginal bristles and with a dark brown to black spot at its base extending nearly half the length, the remainder is yellow. Metanotum black. *Legs :* Front femora each with a brown spot on posterior surface near apical third, otherwise femora all yellow. The middle and hind tibiae and tarsi are brown ; the front are yellow, lightly tinged with brown. *Abdomen :* Predominantly dark brown to black ; the basal portion of the first tergum is yellowish ; the sides and apical corners of the fourth tergum are yellow ; the fifth is predominantly yellow with a brown to black spot in the middle ; the sixth tergum is all yellow. Ovipositor yellow, broken on the type.

Length : Body, not including ovipositor, 7·25 mm.

Note : Walker described the wings as " nearly limpid, with two brown bands, the interior one abbreviated hindward ; veins black, testaceous at the base ".

Trypeta sarnia Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1029.

The type female is labeled " Locality?, ex coll. *W. W. Saunders* ".

This is a Tephritinae belonging to the genus *Paracantha* Coquillett. It is in the British Museum as a synonym of " *Carphotricha culta* Wiedemann (1830, *Ausser. Zweifl. Ins.* **2** : 486). This is the type of the genus *Paracantha* and the synonymy has apparently not been recorded in the literature. Walker's specimen probably came from the United States, the species ranges through southern U.S.

Trypeta culta Loew (1862, *Smiths. Inst. Misc. Coll.* **6** (**1**) : 58, 94, pl. 2, fig. 19) (= *Paracantha cultaris* Coquillett, 1894, *Can Ent.* **26** : 72) is evidently a distinct species and ranges through Mexico, Central America and the Pacific coast of America.

Trypeta signifacies Walker

(Pl. 16, fig. 35)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 165.

The type male labeled " East Indies, Moluccas, Amboyna, *W. W. Saunders*, B.M. 1868.4 " is in good condition except that the head is missing.

This is an Otitidae, apparently belonging in the genus *Dasyortalis* Hendel. It does not, however, fit any of the species in the British Museum collection. The mesonotum and scutellum are black, faintly metallic blue-green. The pleura are dark brown ; the upper margin of the mesopleura and the upper portion of the pteropleura are yellow. The front and middle femora are brown above, yellow on the venter. The hind femur is all brown except for the narrow apex. The tibiae and tarsi are yellow. The abdomen is entirely shining black. Wings as in Pl. 16, fig. 35. The subcostal vein curves up sharply at a right angle at its apex (tephritid-like). Vein R1 is setulose to its base. The radial sector is not setulose. Vein R4 + 5 is setulose throughout and the base of vein Cu1 has setae over its entire length to the m-cu crossvein. The cubital cell is truncate at apex (Pl. 16, fig. 35).

Trypeta sinica Walker

1857, *Trans. Ent. Soc. Lond.* **4** (**5**) : 229.

The type specimen is evidently from the " Amazon, Brazil ", Walker was in error when he recorded the type as being from China. This is in the collection as a synonym of *Hexachaeta eximia* (Wiedemann) (1830, *Ausser. Zweifl. Ins.* **2** : 477), this is apparently a new synonym.

Trypeta stella Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1030.

The type male labeled " India, N. Bengal, *Lieut. Campbell*, B.M. 1812–25 " is in good condition. One paratype labeled " India, *W. W. Saunders*, B.M. 1868–4 " is in poor condition, it is covered with fungus.

This is a Tephritinae belonging in the genus *Platensina* Enderlein, 1911 (*Tephrostola* Bezzi, 1913 is a synonym) and *stella* Walker is a new synonym of *P. acrostacta* (Wiedemann) (1824, *Anal. Entom.* **54** : 119), based upon a comparison of specimens in the British Museum collection. For an adequate description (as *Tephrostola acrostacta* (Wiedemann) refer to Bezzi (1913, *Mem. Ind. Mus.* **3** : 153, pl. X, fig. 57).

Trypeta stellipennis Walker

(Pl. 16, fig. 36)

1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 159.

Walker indicated a male and a female in his original. The specimen marked type is a male labeled " Macassar, Celebes, *A. R. Wallace*, ex coll. *Saunders* 68.4 ". It is in good condition. Two other specimens are in the collection under *stellipennis* from " Ternate " and " near Macassar, *A. R. Wallace*, 58.142X ". The latter two were incorrectly placed and are specimens of *Hexacinia punctifera* (Walker).

T. stellipennis is a Trypetinae belonging in the genus *Hexacinia* Hendel (new combination). This was treated as a synonym of *Acinia stellata* Macquart by Enderlein (1911, *Zool. Jahrb. Syst.* **31** : 433). This synonymy is not correct. (*Note : Hexacinia radiosa* (Rondani) is the correct name for *stellata* Macquart since *Acinia stellata* is preoccupied.)

Hexacinia stellipennis is related to *H. stigmatoptera* Hendel, from the Philippine Islands, and differs as follows : By having nine or more brown to black spots on the pleura, rather than pleura with no distinct spots ; by having the wing bases entirely brown fumose, no distinct hyaline spot at the base of cell R1 ; by having the hyaline spot beyond the middle of cell R1 rectangular in shape (Pl. 16, fig. 36) ; rather than having the wing base subhyaline and marked quite differently from above; and also by having the fifth tergum of the male entirely rufous, rather than all black except for a yellow spot in the middle. For details of the wings see Pl. 16, fig. 36.

Length : Wing, 6·0 mm.

Trypeta subocellifera Walker

1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 120.

The type male is in poor condition, the abdomen and one hind leg are missing. It is labeled " East Indies, Aru Island, *A. R. Wallace*, ex coll. *W. W. Saunders*, 68.4 ".

This is a Lauxaniidae in the collection under *Sapromyza* Fallén. *S. pulcherrima* Kertesz (1900, *Termes. Fuzetek*, **23** : 258) is listed as a synonym.

Trypeta transiens Walker

(Pl. 16, fig. 37)

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 164.

The type is in such poor condition that the sex cannot even be ascertained, the abdomen, one wing, the hind legs, one middle leg and a portion of the thorax are missing. It is labeled " East Indies, Moluccas, Amboina Island, *W. W. Saunders*, B.M. 1868–4 ".

This is a Trypetinae belonging in the genus *Euphranta* Loew. It is distinct from anything in the British Museum collection or any species known to me. It is characterized by the wing markings as shown in Pl. 00, fig. 37 ; the hyaline mark at the tip of cell R5 bisecting the yellow-brown fumose band around the wing tip characterizes this from other species.

Descriptive Notes Based Upon the Type

Head : Three pairs of rather well-developed inferior fronto-orbital bristles are present on the right side of the front, on the left side four pairs are present (an extra bristle is developed near the lower part of the front). The frontal bristles more nearly place this in Malloch's genus *Cyclopsia*, in his key (1939, *Proc. Linn. Soc. N. S. Wales*, **64** (**3–4**) : 441) it would run to this genus except that the inferior fronto-orbitals are not weak. The upper pair, however, is well spaced from the superior fronto-orbital bristles, the distance between these two bristles is almost as great as that between the superior fronto-orbitals and the vertical bristles. The front is about one-third longer than wide, measured from the lower ocellus to the lunule and is predominantly black, the lower margin is yellow ; the upper orbits are also yellow. The vertex is yellow, as are the face, genae and lower occiput. The basal antennal segment is rufous ; the third segment is reddish brown. The arista is short plumose, the longest hairs are about equal to half the width of the third antennal segment. The third is about two and one-half times longer than wide and extends approximately to the oral margin, the apex is rounded. *Thorax :* Predominantly dark brown to black in ground color ; chiefly gray pollinose on the dorsum, especially down the median portion and over the suture and the hind portion. The median posterior portion of the mesonotum is yellow, just before the scutellum. The notopleural callus and the humeri, except for the front margins are yellow ; the anterior portion of each humerus is brown ; the hypopleura are yellow ; the pleura are otherwise brown. The pleurotergite is densely covered with long, fine hair. The scutellum is all yellow and has four strong, marginal bristles. The dorsocentral bristles are placed about halfway between the anterior supraalar and the inner posterior supraalar bristles. The prescutellar bristles are lacking and there are no presutural bristles. *Legs :* The front legs are predominantly rufous, lightly tinged with brown on the tibiae and tarsi. The middle legs are chiefly brown to black, the dorsal surface and the apical third of each femur are yellow, the apex of the tibia and the basitarsus is tinged with yellow. *Wings :* As in Pl. 16, fig. 37. The setae on vein R1 extend a considerable distance beyond the humeral crossvein (about one-third the distance to the base of the vein). R4 + 5 is setulose to just beyond the r-m crossvein. The radial sector is bare. The r-m crossvein is situated at about the apical three-fifths of cell 1st M2.

Length of wing : 6·0 mm.

Trypeta tubifera Walker

1857, *Trans. Ent. Soc. Lond.* **4** (**5**) : 230.

The type female is labeled " China, B.M. 68.4 " but this is obviously an error. This is an *Anastrepha* Schiner and has been treated under this combination by Stone (1942, *U.S.D.A. Misc. Pub.* **439** : 49). He said that " the species most closely resembles certain Antillean species, and it is not improbable that it actually came from the West Indies ".

Refer to Stone (*loc. cit.*) for a description of the species and for figures of the wings and the ovipositor (pl. 8, fig. D and pl. 23, fig. D).

Trypeta tucia Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1021.

The type female is in very poor condition, the head, abdomen and some of the legs are missing and the thorax is covered with fungus. It is labeled " India, N. Bengal, ? collector ".

This is a Trypetinae belonging in the genus *Sphaeniscus* Becker (*Spheniscomyia* Bezzi, 1913, was an invalid emendation. See Hardy, 1955, *Pac. Sci.* **9** (**1**) : 77) and is a synonym of *S. quadrincisa* (Wiedemann) (see Bezzi, 1913, *Mem. Ind. Mus.* **3** : 147). Bezzi discusses this species and figures the wing (pl. X, fig. 52).

Urophora fasciata Walker

(Pl. 16, fig. 38)

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 134.

The female specimen in the collection labeled " Type?", " SAR " [for Sarawak, Borneo] and with the handwritten label " *fasciata* " is obviously the type. It is in fair condition except that the antennae are missing.

This is a Trypetinae which apparently belongs in the genus *Gastrozona* Bezzi, as defined by Malloch (1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 442). I see no way to separate *Carpophthoromyia borneensis* Hering (1952, *Treubia,* **21** (**2**) : 283, fig. 12) from *Gastrozona fasciata* (Walker) (new combination) and on the basis of Hering's description and figure I consider them synonymous. At the present time I see no real justification for considering this species in *Carpophthoromyia* until the group can be more thoroughly studied. *Gastrozona* may prove to be a synonym of *Carpophthoromyia* ; the only good structural differences which I have noticed are that the ocellar bristles are small, poorly developed and the arista is long plumose in the *Gastrozona* which I have studied, from the Orient and Pacific, and the ocellar bristles are very strongly developed and the arista short haired in the specimens of *Carpophthoromyia* which I have seen, from Africa. The two groups also differ strikingly in body coloration and wing markings. I do not consider the characters used by Hendel (1914, *Wien. Ent. Zeit.* **33** : 80) of particular importance in separating these two.

Descriptive Notes Based on the Type

Head : Two pairs of inferior fronto-orbital and two pairs of superior fronto-orbital bristles present. All of the frontal bristles are strong, the upper inferior fronto-orbital is situated near the middle of the front ; the lower superior fronto-orbital is at the upper third of the front. The ocellar bristles are very tiny, hairlike. The front is about one-third times longer than wide and is entirely yellow. The face is all yellow and is very slightly concave in profile. A brown spot is present on each of the genae. The epistoma is just slightly protruded. The lower portion of the occiput is puffed, at its broadest point it is approximately two-thirds as wide as the eye ; the occiput has a brown to black spot at each upper corner along the eye margin. *Thorax :* Mesonotum entirely polished blue-black. The dorsocentral bristles are situated on a line between the anterior supraalars. The prescutellar bristles are situated on a line with the postalars. The humeri are largely dark brown to black with a narrow ring of yellow around the margins. The mesopleura and hypopleura are yellow ; the pleura are otherwise dark brown to polished black. The scutellum is yellow with a black spot on each side of the margin just below the lateral bristles and with a black spot at apex just below the apical bristles. Metanotum entirely black. *Legs :* The front legs, except the coxae, are entirely yellow to rufous. The middle femora are predominantly brown, the hind femora are largely yellow, discolored with brown at the apical third. The tibiae and tarsi are all yellow. The middle tibia has two large black spurs at the apex. *Wings :* The extreme base of the wing is hyaline. The veins are white. The remainder of the wing is predominantly dark brown fumose with a hyaline streak originating at the hind margin in the anal cell, extending across the cubital vein, the median veins up to vein R4 + 5 and then bent downward and extending back to the wing margin through cell 2nd M2 ; another hyaline streak extends obliquely through the apex of cell R5 (Pl. 16, fig. 38). Cell R1 has three hyaline spots on costal margin and a thin hyaline streak is present along the costa in cell R3 and at apex of R1. Vein R1 is densely haired to the node and a few setae extend below this point about halfway to the base. Vein R4 + 5 is setulose to its base. The radial sector is bare. Vein M3 + 4 is bare but vein M1 + 2 has scattered setae extending from the base to the r-m crossvein. Vein R2 + 3 is straight, or nearly so. Vein R4 + 5 is rather arcuate on the last section. The fifth section of the costa is slightly more than half the length of the fourth. The cubital cell has a slender, rather elongate lobe at its apex below (Pl. 16, fig. 38). *Abdomen :* Predominantly shining black, rather thickly covered with gray pollen. The apex of the second tergum is yellow. The third is all black, the fourth and fifth are yellow in ground color, the apical halves of the fourth and fifth are densely covered with white pubescence and white pile. The sixth tergum is black with a narrow rim of yellow at the apex. Ovipositor black, the basal portion, *in situ*, is equal in length to segments three to six.

Length : Wing, 7·0 mm.

Xarnuta leucotelus Walker

(Pl. 16, fig. 39)

1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 28.

The type male labeled " Singapore, A. R. Wallace, 55–9 " is in fair condition. Two other specimens are in the collection, one from " Aru Island, A. R. Wallace, 58–48 " and one from " Java, Hon. E. Ind. Coy, 51.112 ".

This is the type of the genus *Xarnuta* Walker and was described as a " Helomyzides ". The species is very well defined, it is distinguished from other known *Xarnuta* by the evenly brown fumose wings, with no evidence of transverse fasciae or hyaline spots, except for the hyaline apex of cell R5 (extreme apex of wing) (Pl. 16, fig. 39). The hind angle of the wing is slightly paler colored than the remainder, varying from yellow-brown, in the type, to yellow fumose in one of the other specimens. The wings are very broad. The radial vein is setulose well in front of the humeral crossvein. Body almost entirely rufous, with three rather faint narrow vittae extending down the median portion of the mesonotum, one central and two submedian ; these extend from near the front margin to the dorsocentral bristles. Also another faint stripe is present on each side extending from behind the suture to the hind margin. The generic characters are as described for *X. lativentris* (Walker).

Length : Body, 7·25 mm.; wings, 6·7 mm.

CHECK LIST OF THE WALKER SPECIES TREATED IN THIS PAPER, CORRECTED COMBINATIONS

FAMILY CHLOROPIDAE

Genus? *fulvitarsis* (Walker), n. comb.
(Pl. 11, fig. 9)

Dacus fulvitarsis Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 153.
Dacus pallitarsis Walker, cabinet name.

FAMILY LAUXANIIDAE

Sapromyza dorsiguttata (Walker), n. comb.

Trypeta dorsiguttata Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 119.
Platystoma basale Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 148. New synonymy based upon a comparison of the type in the British Museum, from " Makessar ", with the type of *dorsiguttata*.

Sapromyza impleta (Walker), n. comb.

Trypeta impleta Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 120.

Sapromyza subocellifera (Walker)

Trypeta subocellifera Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 120.
Sapromyza pulcherrima Kertesz, 1900, *Termes. Fuzetek,* **23** : 258.

Sapromyza roripennis (Walker), n. comb.

Trypeta roripennis Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 131.

FAMILY OTIDIDAE

Antineura devia (Walker)

Dacus devius Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 250.

Antineura pubiseta (Walker)

Dacus pubiseta Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 294.

Antineura strigifer (Walker)

Dacus strigifer Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 13.

Celetor caerulea (Macquart)

Tephritis caerulea Macquart, 1846, *Dipt. Exot., Suppl.* **1** : 212, pl. 18, fig. 15.
Trypeta cluana Walker, 1849, *List. Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1019.

Cleitamia latifascia (Walker), n. comb.

Dacus latifascia Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 114.

Cleitamia liturata (Walker)

Dacus lituratus Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 251.

Conicipithea addens (Walker)

Dacus addens Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 149.

Dasyortalis signifacies (Walker), n. comb.
(Pl. 16, fig. 35)

Trypeta signifacies Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 165.

Elassogaster sepsoides (Walker)

Dacus sepsoides Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 163.

Elassogaster signatipes (Walker)

Dacus signatipes Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 163.

Elassogaster sordidus (Walker), n. comb.

Dacus sordidus Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 251.
Dacus varialis Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 123. New synonymy.

Genus? *cylindrica* (Walker)

Trypeta cylindrica Walker, 1852, *Ins. Saunders.* **4** : 380.

Icteracantha chalybeiventris (Wiedemann)

Trypeta chalybeiventris Wiedemann, 1830, *Ausser. Zweifl. Ins.* **2** : 479.
Dacus bicolor Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1071.

Lamprogaster instabilis (Walker), n. comb.

Dacus instabilis Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 250.
Lamprogaster gracilis Hendel, 1914, *Abh. K. K. Zool-Bot. Ges., Wien,* **8** (**1**) : 225. New synonymy.

Lamprophthalma sepedonoides (Walker), n. comb.

Dacus sepedonoides Walker, 1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 228.

Philocompus divergens (Walker)

Dacus divergens Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 149.

Plagiostenopterina basalis (Walker)

Dacus basalis Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1072.

Plagiostenopterina imitans (Walker)

Dacus imitans Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 150.

Plagiostenopterina inaptus (Walker), n. comb.

Dacus inaptus Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 151.

Plagiostenopterina lativentris (Walker), n. comb.

Dacus lativentris Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 115.
Plagiostenopterina (*Stenopterosoma*) *orbitalis* Malloch, 1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**1–2**) : 114. New synonymy.

Plagiostenopterina longivitta (Walker)

Dacus longivitta Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 115.

Plagiostenopterina trivittata (Walker)

Dacus trivittatus Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1072.

Pogonortalis doclea (Walker)

Trypeta doclea Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1035.
Pogonortalis barbifera Hendel, 1914, *Abh. K. K. Zool.-Bot. Ges. Wien,* **7** (**1**) : 144. The type of the genus *Pogonortalis* Hendel.

Pseudepicausta chalybea (Doleschall)

Herina chalybea Doleschall, 1858, *Naturk. Tijds. v. Ned. Indie,* **17** : 125.
Dacus obtrudens Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 116.

Pseudepicausta contrahens (Walker)

Dacus contrahens Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 151. Placed in this combination by Hendel (1914, *Gen. Ins.* **157** : 64).

Pseudepicausta detrudens (Walker)

Dacus detrudens Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 135.

Pseudepicausta exigens (Walker)

Dacus exigens Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 151.

Pseudepicausta experta (Walker)

Dacus expertus Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 14.

Pseudepicausta mutilloides (Walker)

Dacus mutilloides Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 115.

Pseudepicausta pompiloides (Walker)

Dacus pompiloides Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 116.

Rhegmatosaga latiuscula (Walker), n. comb.

Noeeta latiuscula Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.
Rhegmatosaga insignis Frey, 1930, *Not. Ent.* **10** : 63, fig. 8. The type of the genus *Rhegmatosaga* Frey. New Synonymy.

Rivellia distobasalis, n. name.

Trypeta basalis Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 120. *Nomen bis lectum.*

FAMILY PYRGOTIDAE

Campylocera? squalida (Walker), n. comb.
(Pl. 12, fig. 12)

Dacus squalidus Walker, 1860, *Trans. Ent. Soc. Lond. n.s.* **5** : 323.

Tephritopyrgota ferruginea (Walker), n. comb.

Trypeta ferruginea Walker, 1852, *Ins. Saunders.* **4** : 387.

FAMILY TEPHRITIDAE

Acanthoneura vaga (Wiedemann)

Trypeta vaga Wiedemann, 1830, *Ausser. Zweifl. Ins.* **2** : 490.
Trypeta mutyca Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1036. New synonymy.

Adrama determinata (Walker)

Dacus determinatus Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.
Adrama austeni Hendel, 1912, *Wien. Ent. Ztg.* **31** : 12. New synonym. Based upon the comparison of the type male, allotype female and a series of 19 specimens from Borneo and a large series of specimens from Borneo, Java, Malaya, Philippine Islands, Thailand, Burma, Ceylon, and India.

Adrama selecta Walker
(Pl. 11, fig. 2)

Adrama selecta Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 118. Type of the genus *Adrama* Walker.
Enicoptera rufiventris Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 163. New synonymy.
Psila cruciata Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 126. A synonym according to Osten Sacken (1881, *Ann. Mus. Civ. Stor. Nat. Genova,* **16** : 474).

Anastrepha tubifera (Walker)

Trypeta tubifera Walker, 1857, *Trans. Ent. Soc. Lond.* **4** (**5**) : 230.

Anomoia (*Euleia*) *fossata* (Fabricius), n. comb.

Tephritis fossatus Fabricius, 1805, *Syst. Antl.*, p. 320.
Trypeta elimia Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1033.

Callantra smieroides Walker

Callantra smieroides Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 154. The type of the genus *Callantra* Walker.
Callantra smicroides Bezzi, 1916, *Bull. Ent. Res.* **7** : 120.

Carpophthorella nigrifascia (Walker), n. comb.
(Pl. 16, fig. 34)

Trypeta nigrifascia Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 158.

Carpophthorella retorta (Walker), n. comb.

Trypeta retorta Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 16.

Clusiosoma lateralis (Walker), n. comb.

Dacus lateralis Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 123.
Clusiosoma biseriata Malloch, 1939, *Jour. Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 426. New synonymy.

Curticella [N. Genus] *approximans* (Walker), n. comb.
(Pl. 15, figs. 29*a-b*)

Trypeta approximans Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 160. The type of the new genus *Curticella* Hardy.

Curvinervus [N. Genus] *walkeri*, change of name
(Pl. 15, fig. 26*a–b*)

Strumeta concisa Walker, 1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 227. The type of the new genus *Curvinervus* Hardy.

Cyclopsia inscripta (Walker), n. comb.

Dacus inscriptus Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 162.
Cyclopsia inaequalis Malloch, 1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 445. The type of the genus. New synonymy.

Dacus (*Neodacus*) *absolutus* Walker, n. comb.

Dacus absolutus Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 22.

Dacus (*Paradacus*) *areolatus* Walker, n. comb.
(Pl. 11, fig. 3)

Dacus areolatus Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 295.

Dacus (*Strumeta*) *biarcuatus* Walker, n. comb.
(Pl. 11, fig. 4)

Dacus biarcuatus Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 122.

Dacus (*Dacus*) *bivittatus cucumarius* Sack

Dacus cucumarius Sack, 1908, *Ber. Senckenb. Naturf. Ges.*, p. 10.
Dacus pectoralis Walker, 1861, *Trans. Ent. Soc. Lond. n.s.* **5** : 322.

Dacus (*Daculus*) *brevistriga* Walker, n. comb.

Dacus brevistriga Walker, 1860, *Trans. Ent. Soc. Lond. n.s.* **5** : 322.
Dacus katonae Bezzi, 1924, *Bull. Ent. Res.* **15** (**1**) : 86. Probable synonym.
Dacus asclepiadens Bezzi, 1924, *Ann. S. Afr. Mus.* **19** : 468 (synonym according to Munro, 1957, *Brit. Mus. Ruwenzori Exped.* **2** (**9**) : 860).
Leptoxyda brevistriga Malloch, 1932, *Ann. Mag. Nat. Hist. ser.* 10, **10** : 300.

Dacus (*Strumeta*) *cucurbitae* Coquillett

Dacus cucurbitae Coquillett, 1899, *Ent. News,* **10** : 129.
Dasyneura caudata Walker, *nec* Fabricius, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1073. New synonymy.

Dacus (*Neodacus*) *curvifer* Walker
(Pl. 11, fig. 6)

Dacus curvifer Walker, 1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 229.
Dacus speculifer Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 122. New synonymy.

Dacus (*Daculus*) *discipennis* Walker
(Pl. 11, fig. 7)

Dacus discipennis Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 294.

Dacus (*Zeugodacus*) *emittens* Walker

Dacus emittens Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 152.

Dacus (*Paratridacus*) *expandens* Walker

Dacus expandens Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 114.

Dacus (*Didacus*) *fuscatus* Wiedemann

Dacus fuscatus Wiedemann, 1819, *Zool. Mag.* **1** (**3**) : 28.
Dasyneura nebulosa Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1076. New synonymy.
Dacus nebulosa Walker, *nom. nud.*

Dacus (*Strumeta*) *incisus* Walker, n. comb.

Dacus incisus Walker, 1860, *Trans. Ent. Soc. Lond. n.s.* **5** : 323.

Dacus (*Strumeta*) *pectoralis* Walker

Dacus pectoralis Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 114.
Dacus ferrugineus var. *obscurata* de Meijere, 1911, *Tijds. v. Ent.* **54** : 374. A probable synonym.

Dacus (*Paradacus*) *perplexus* Walker
(Pl. 12, fig. 11)

Dacus perplexus Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 14.
Dacus implexus Walker, cabinet name.

Dacus sexmaculatus Walker, sp. indet.

Dacus sexmaculatus Walker, 1871, *The Entomologist*, **5** : 344.

Dacus (*Neodacus*) *strigifinis* Walker, n. comb.

Dacus strigifinis Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 295.
Neodacus lanceolatus Perkins, 1939, *Univ. Queensland Papers, Dept. Biol.* **1** (**10**) : 22, pl. 1, fig. 1. New synonymy.
Dacus (*Chaetodacus*) *albolateralis* Malloch, 1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 413, pl. XI, fig. 2.

Dacus (*Zeugodacus*) *tau* (Walker), n. comb.

Dasyneura tau Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1074.
Dacus hageni de Meijere, 1911, *Tijds. v. Ent.* **54** : 375. New synonymy.
Dacus caudatus var. *nubilus* Hendel, 1912, *Suppl. Ent.* **1** : 16.
Zeugodacus caudatus Perkins, *nec* Fabricius, 1938, *Proc. Roy. Soc. Queensland,* **49** (**11**) : 139.
Zeugodacus nubilus heinrichi Hering, 1941, *Siruna Seva,* **3** : **11**.
Zeugodacus bezzianus Hering, 1941, *Arb. Über Morph. u. Tax. Ent.* **8** (**1**) : 26.

Dacus (*Zeugodacus*) *terminifer* Walker, n. comb.
(Pl. 12, fig. 13)

Dacus terminifer Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 152.

Dacus (*Strumeta*) *umbrosus* Fabricius

Dacus umbrosus Fabricius, 1805. *Syst. Antl.*, p. 274.
Strumeta conformis Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 34.
Dacus diffusus Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 153. New synonymy.

Dimeringophrys bilineatus (Walker), n. comb.
(Pl. 11, fig. 5)

Dacus bilineatus Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 150.
Dimeringophrys ortalina Enderlein, 1911, *Zool. Jahrb.* **13** (**3**) : 452. The type of the genus. New synonymy.

Diplochorda concisa (Walker)

Dacus concisus Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 252.
Dacus turgidus Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 134. Recorded by Osten Sacken (1881, *Ann. Mus. Civ. Stor. Nat. Genova,* **16** : 487).

Dirioxa pornia (Walker), n. comb.

Trypeta pornia Walker, 1849, *List. Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1039.
Trypeta musae Froggatt, 1899, *Agr. Gaz. N. S. Wales,* **10** : 501. The type of *Dirioxa* Hendel.

Enicoptera tortuosa Walker
(Pl. 13, fig. 16)

Enicoptera tortuosa Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 155.

Euphranta? figurata (Walker), n. comb.
(Pl. 11, fig. 8)

Dacus figuratus Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.

Euphranta (*Staurella*) *rudis* (Walker), n. comb.

Trypeta rudis Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 133.

Euphranta transiens (Walker), n. comb.
(Pl. 16, fig. 37)

Trypeta transiens Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 164.

Eurosta comma (Wiedemann)

Trypeta comma Wiedemann, 1830, *Ausser. Zweifl. Ins.* **2** : 478.
Trypeta alvea Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1027.
Trypeta dertona Walker, 1849, *loc. cit.*

Gastrozona fasciata (Walker), n. comb.
(Pl. 16, fig. 38)

Urophora fasciata Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 134.
Carpophthoromyia borneensis Hering, 1952, *Treubia,* **21** (**2**) : 283, fig. 12. New synonymy.

Genus? (near *Acidia*) *contraria* (Walker)
(Pl. 15, fig. 30)

Trypeta contraria Walker, 1853, *Ins. Saunders.* **4** : 385, pl. VIII, fig. 7.

Hemilea bipars (Walker), n. comb.
(Pl. 14, fig. 22)

Sophira bipars Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 23.

Hexachaeta eximia (Wiedemann)

Trypeta eximia Wiedemann, 1830, *Ausser. Zweifl. Ins.* **2** : 477.
Trypeta lutescens Walker, 1857, *Trans. Ent. Soc. Lond.* **4** : 41. New synonymy.
Trypeta sinica Walker, 1857, *Trans. Ent. Soc. Lond.* **4** (**5**) : 229. New synonymy.

Hexacinia punctifera (Walker), n. comb.

Sophira punctifera Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 15.
Hexacinia multipunctata Malloch, 1939, *Proc. Linn. Soc. N. S. Wales,* **64** (**3–4**) : 438, pl. **11**, fig. 13. New synonymy.

Hexacinia stellipennis (Walker), n. comb.
(Pl. 16, fig. 36)

Trypeta stellipennis Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 159.

Neosophira arcuosa (Walker), n. comb.
(Pl. 12, figs. 14*a–b*)

Enicoptera arcuosa Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 156.
Neosophira ferruginea Hendel, 1914, *Abh. K. K. Zool-Bot. Ges. Wien,* **8** (**1**) : 138. New synonymy.

Neosophira distorta (Walker)
(Pl. 14, figs. 24*a–b*)

Sophira distorta Walker, 1857, *Trans. Ent. Soc. Lond. n.s.* **4** : 230. Type of genus *Neosophira* Hendel.
Enicoptera pictipennis Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 155.

Neothemara formosipennis (Walker)

Rioxa formosipennis Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 252. The type of the genus *Neothemara* Malloch.

Neothemara multistriga (Walker), n. comb.
(Pl. 16, fig. 33)

Trypeta multistriga Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 119.

Neothemara repleta (Walker), n. comb.
(Pl. 15, fig. 27)

Strumeta repleta Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 296.

Paracantha culta (Wiedemann)

Carphotricha culta Wiedemann, 1830, *Ausser. Zweifl. Ins.* **2** : 486.
Trypeta sarnia Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1029. New synonymy.

Paraeuphranta [N. Genus] *furcifer* (Walker), n. comb.
(Pl. 12, figs. 10*a–c*)

Dacus furcifer Walker, 1862, *Jour. Proc. Linn. Soc. Lond.* **6** : 14. Type of *Paraeuphrante* Hardy.

Phytalmia nigrilinea (Walker), n. comb.

Dacus? nigrilinea Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 251.
Phytalmia? wollastoni Edwards, 1915, *Trans. Zool. Soc. Lond.* **20** : 418. New synonymy.

Platensina acrostacta (Wiedemann)

Trypeta acrostacta Wiedemann, 1824, *Anal. Entom.* **54** : 119.
Trypeta stella Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1030. New synonymy.

Platensina amplipennis (Walker)
(Pl. 15, fig. 28)

Trypeta amplipennis Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 159.

Polyara insolita Walker

Polyara insolita Walker, 1859, *Jour. Proc. Linn. Soc. Lond.* **3** : 123. The type of the genus and only known species.

Ptilona confinis Walker

Rioxa confinis Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 132.
Rioxa? bimaculata Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 164.
Trypeta basifascia Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 158.
Ptilona brevicornis van der Wulp, 1880, *Tijds. v. Ent.* **23** : 185, pl. **11**, fig. 7. New synonymy. This is the type of the genus *Ptilona* van der Wulp.
Ptilona nigriventris Bezzi, 1913, *Mem. Ind. Mus.* **3** : 110, pl. VIII, fig. 20.
Ptilona armatipes Hering, 1953, *Siruna Seva*, **8** : 4, fig. 4. New synonymy.

Rioxa lanceolata Walker
(Pl. 13, fig. 18)

Rioxa lanceolata Walker, 1857; *Jour. Proc. Linn. Soc. Lond.* **1** : 35, pl. II, fig. 3. The type of the genus *Rioxa* Walker.

Rioxina abbreviata (Walker)
(Pl. 13, figs. 19*a–c*)

Seraca abbreviata Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 117. The type of the genus *Rioxina* Hering.
Rioxa de-beauforti de Meijere, 1906, *Nova Guinea Dipt.* **5** (**1**) : 94, fig. 17. New synonymy.

Seraca concinna (Walker), n. comb.
(Pl. 14, figs. 23*a–c*)

Sophira concinna Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 132.

Seraca plagifera (Walker), n. comb.
(Pl. 13, fig. 15)

Enicoptera? plagifera Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 156.
Sophira bistriga Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 160. New synonymy, *plagifera* is given page priority.
Colobostrella ruficauda Hendel, 1915, *Ann. Mus. Nat. Hung.* **13** : 429. New synonymy.

Seraca signifera Walker

Seraca signifera Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 165. The type of the genus *Seraca* Walker.
Colobostrella ruficauda Hendel, 1914, *Wien. Ent. Zeit.* **33** : 79.

Soita psiloides Walker
(Pl. 14, figs. 21*a–b*)

Soita psiloides Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 136. The type of the genus *Soita* Walker.

Sophira signata (Walker), n. comb.

Seraca signata Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 165.

Sophira venusta Walker
(Pl. 15, fig. 25)

Sophira venusta Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 35. The type of the genus *Sophira* Walker.

Sosiopsila consors (Walker), n. comb.
(Pl. 11, fig. 1)

Adrama consors Walker, *Jour. Proc. Linn. Soc. Lond.* **5** : 296.

Sphaeniscus quadrincisa (Wiedemann)

Trypeta quadrincisa, 1824, *Anal. Entom.*, p. 55.
Trypeta tucia Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1021.

Sphaeniscus sexmaculatus atilia (Walker)

Trypeta atilia Walker, 1849, *List. Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1021.
Trypeta melaleuca Walker, 1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 238.

Tephritis poenia (Walker), n. comb.

Trypeta poenia Walker, 1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1025.
Tephritis pelia Schiner, 1868, *Reise Novara, Zool.* **2**, 1 *abt.*, *B. Diptera*, p. 271. New synonymy.

Themara maculipennis (Westwood)

Achias maculipennis Westwood, 1848, *Cab. Orient. Ent.*, p. 38, pl. 18, fig. 4.
Themara ampla Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 33, pl. 1, fig. 5. The type of the genus *Themara* Walker.

Themarohystris helomyzoides (Walker), n. comb.

Strumeta helomyzoides Walker, 1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 220.
Themarohystris erinaceus Hendel, 1914, *Ann. Mus. Nat. Hung.* **13** : 433. New synonymy. The type of the genus *Themarohystris* Hendel.

Themaroides quadrifera (Walker)
(Pl. 13, fig. 17)

Helomyza quadrifera Walker, 1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 246. The type of the genus *Themaroides* Hendel.
Helomyza optatura Walker, 1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 116.
Themara ampla Doleschall, *nec* Walker, 1859, *Nat. Tijds. Ned. Indie* **17** : 154. *Nomen nudum.*

Trypeta antiqua Walker, sp. indet.

Trypeta antiqua Walker, 1852, *Ins. Saunders.* **4** : 378.

Xarnuta lativentris (Walker), n. comb.
(Pl. 16, fig. 32)

Trypeta lativentris Walker, 1860, *Jour. Proc. Linn. Soc. Lond.* **4** : 158.

Xarnuta leucotelus Walker
(Pl. 16, fig. 39)

Xarnuta leucotelus Walker, 1857, *Jour. Proc. Linn. Soc. Lond.* **1** : 28. The type of the genus *Xarnuta* Walker.

Xanthaciura? basalis (Walker)

Trypeta basalis Walker, 1852, *Ins. Saunders.* **4** : 380.

LIST OF WALKER SPECIES OF FRUIT FLIES WHICH I DID NOT STUDY

The types are in the British Museum, unless otherwise indicated.

Helomyza meritoria Walker

1864, *Jour. Proc. Linn. Soc. Lond.* **7** : 218. Mysol.

Bezzi (1913, *Mem. Ind. Mus.* **3** : 75) said Czerny had studied the type in the British Museum collection and said it " is not a Helomyzid, but a Trypaneid ; from the wing-pattern it seems to be related to *Rioxa* ".

I was unable to locate the type when I was at the British Museum in 1954 but Mr. D. J. Clark of the Diptera section has since located it and said that it runs to this genus in Malloch's key (1939 : 417).

H. nivistriga Walker

1861, *Jour. Proc. Linn. Soc. Lond.* **5** : 246. New Guinea.

Bezzi (1913, *Mem. Ind. Mus.* **3** : 76) said " Czerny in 1904, after examination of the type in the British Museum, has stated that this is not a Helomyzid, but a Trypaneid, and I think that it is probably a *Rioxa* ".

I was unable to locate the type in 1954 but Mr. D. J. Clark has since found it. He reported that the head was missing and that he could not be certain of the genus but that he thinks it is not a *Rioxa*.

H. ortalioides Walker

1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 116.

According to Bezzi (1913, *Mem. Ind. Mus.* **3** : 77) " Czerny, after examining the type in London, states that it is a Trypaneid ".

H. stelliplena Walker

1865, *op. cit.* : 117.

This may possibly be a fruit fly. It is listed in the card file at the British Museum under " Trypetidae genus?" but I did not study the type. Mr. Clark reports that the head is missing.

Tephritis mellea Walker

1837, *Trans. Linn. Soc. Lond.* **17** : 358. Brazil.

T. quinquefasciata Walker

1837, *op. cit.* : 357. South America.

T. unicolor Walker

1837, *op. cit.* : 358. Port Famine, Straits of Magellan.

Aczél (1949, *Acta Zool. Lilloana,* **7** : 311) has placed this under the combination *Trypanea unicolor* (Walker).

Trypeta acidusa Walker

1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1014. Jamaica.

Stone (1939, *Jour. Wash. Acad. Sci.* **29** : 349) placed this under the combination *Lucumaphila acidusa* (Walker). [Tephritidae.]

T. adatha Walker

1849, *op. cit.* : 1032. Congo.

T. aesia Walker

1849, *op. cit.* : 1006. Galapagos Isl.

Aczél (1949, *Acta Zool. Lilloana,* **7** : 281) lists this under the combination *Euaresta aesia* (Walker).

T. aex Walker

1849, *op. cit.* : 1037. Brazil.

Hendel (1914, *Abh. Ber. K. Zool. Anthrop. Mus. Dresden,* **14** : 23) listed this under the combination *Hexachaeta? aex* (Walker).

T. aira Walker
1849, *op. cit.* : 1023. Congo.

T. albida Walker
1852, *Ins. Saunds.* **4** : 384. S. Australia. Type not present in British Museum.

T. albovaria Walker
1852, *op. cit.* : 383, pl. 8, fig. 4. Senegal?
Listed by Hendel (1914 *Abh. K. K. Zool-Bot. Ges. Wien,* **8** (**1**) : 364) as a synonym of *Engistoneura maerens* (Fabricius) (1775, *Ent. Syst.* **4** : 349) ; family Otitidae.

T. alcinoe Walker
1849, *op. cit.* : 1010. Loc.?

T. arcuata Walker
1852, *op. cit.* : 383. United States.
Listed by Hendel (1914, *Abh. K. K. Zool.-Bot. Ges. Wien,* **8** (**1**) : 18) as a synonym of *Tritoxa flexa* (Wiedemann) (1830, *Ausser. Zweifl. Ins.* **2** : 384) ; family Otitidae.

T. argus Walker
1849, *op. cit.* : 1033. Bahia.

T. avala Walker
1849, *op. cit.* : 1020. Jamaica.

T. brevivitta Walker
1865. *Jour. Proc. Linn. Soc. Lond.* **8** : 124. New Guinea.
Type not present in British Museum.

T. cassara Walker
1849, *List Spec. Dipt. Ins. coll. Brit. Mus.* **4** : 1026. Peru.
Aczél (1949, *Acta Zool. Lilloana,* **7** : 286) lists this under the combination *Paroxyna cassara* (Walker). *Paroxyna* Hendel (1927) is a synonym of *Stylia* Robineau-Desvoidy (1830) (See Hardy & Adachi, 1956, *Insects of Micronesia,* **14** (**1**) : 21) so the correct name should be *Stylia cassara* (Walker) (new combination).

T. conferta Walker
1852, *Ins. Saunds.* **4** : 379. Columbia.

T. cornifera Walker
1849, *op. cit.* : 1011. Loc.?

T. cornigera Walker
1849, *op. cit.* : 1010. N.A.?

T. cosyra Walker
1849, *op. cit.* : 1042. Congo.

T. cronia Walker
1849, *op. cit.* : 1039. N. Holland.
Hendel (1914, *Abh. Ber. K. Zool. Anthrop. Mus. Dresden,* **14** : 23) lists this under the combination *Hexachaeta? cronia* (Walker).

T. cyana Walker
1849, *op. cit.* : 1031. Sierra Leone.

T. dinia Walker
1849, *op. cit.* : 1040. Jamaica. Hendel (1914, *loc. cit.*) lists this under the combination *Hexachaeta? dinia* (Walker).

T. diversata Walker
1865, *Jour. Proc. Linn. Soc. Lond.* **8** : 124. New Guinea.
Type not present in British Museum.

T. divisa Walker
1852, *op. cit.* : 381. Brazil.

T. donysa Walker
1849, *op. cit.* : 1007. Loc.?

T. dubia Walker
1852, *op. cit.* : 379. Cape.

T. ethalea Walker
1849, *op. cit.* : 1015. Para.
Type not present in British Museum.

T. excepta Walker
1852, *op. cit.* : 387. Brazil.
Type not present in British Museum.

T. flexuosa Walker
1852, *op. cit.* : 382. Cape Coast.

T. hysia Walker
1849, *op. cit.* : 1016. Sierra Leone.

T. laeta Walker
1852, *op. cit.* : 388. Brazil.
Type not present in British Museum.

T. lutescens Walker
1857, *Trans. Ent. Soc. Lond.* **4** (**5**) : 229. Amazon.

T. mevarna Walker
1849, *op. cit.* : 1023. Florida.

T. mixta Walker
1852, *op. cit.* : 385. East Indies.
Type not present in British Museum.

T. narytia Walker
1849, *op. cit.* : 1020. Florida.

T. oborinia Walker
1849, *op. cit.* : 1041. Congo.

T. ocresia Walker
1849, *op. cit.* : 1016. Jamaica.
This is an *Anastrepha* Schiner, see Stone (1942, *U.S.D.A. Misc. Pub.* **439** : 24).

T. pantherina Walker
1852, *op. cit.* : 386. Brazil.

T. parallela Walker
1852, *op. cit.* : 381. Cape.
Type not present in British Museum.

T. polygramma Walker
1860, *Trans. Ent. Soc. Lond. n.s.* **5** : 326. Natal.

T. quadrigutta Walker
1852, *op. cit.* : 386. S. America.
Aczél (1953, *Acta Zool. Lilloana,* **13** : 155) treats this under the combination *Polymorphomyia quadrigutta* (Walker) [Tephritidae]. He had earlier (1949, *op. cit.* 7 : 267) placed it under *Pseudeutreta quadrigutta* (Walker).

T. scutellata Walker
1852, *op. cit.* : 384. Senegal?

T. tritea Walker
1849, *op. cit.* : 1034. Sierra Leone.

T. varia Walker
1852, *op. cit.* : 382. S. America.
Type not present in British Museum.

T. viana Walker
1849, *op. cit.* : 1006. Loc.?

T. voneda Walker
1849, *op. cit.* : 1028. Bahia.

FRANCIS WALKER'S PAPERS IN WHICH FRUIT FLIES ARE DESCRIBED

1836
Descriptions of the British Tephritites. *Ent. Mag.* **3** : 57–85.

1837
Descriptions, etc. of the Insects collected by Captain P. P. King, R.N., F.R.S., in the Survey of the Straits of Magellan. Diptera. *Trans. Linn. Soc. Lond.* **17** : 357–358.

1849
List of the Specimens of Dipterous Insects in the collection of the British Museum, **4** : 1005–1042 and 1071–1077.

1852
Insecta Saundersiana : or characters of undescribed Insects in the collection of W. W. Saunders. Diptera **4** : 378–388.

1857
Catalogue of the Dipterous Insects collected at Singapore and Malacca by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **1** : 28–35.

1857
Catalogue of the Dipterous Insects collected at Sarawak, Borneo, by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **1** : 132–134, pl. 1.

1857
Characters of undescribed Diptera in the collection of W. W. Saunders. *Trans. Ent. Soc. Lond. n.s.* **4** **(5)** : 229–231.

1859
Catalogue of the Dipterous Insects collected in the Aru Islands by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **3** : 114–121 and 131.

1860
Catalogue of the Dipterous Insects collected at Makessar in Celebes by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **4** : 149–160 and 165.

1860
Characters of undescribed Diptera in the collection of W. W. Saunders. *Trans. Ent. Soc. Lond. n.s.* **5** : 322–323 and 326.

1861
Catalogue of the Dipterous Insects collected in Amboyna by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **5** : 162–165.

1861
Catalogue of the Dipterous Insects collected at Dorey, New Guinea, by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **5** : 246, 250–253.

1861
Catalogue of the Dipterous Insects collected at Manado, Celebes, and in Tond, by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **5** : 262, 290–291.

1861
Catalogue of the Dipterous Insects collected in Batchian, Kaisaa and Makian, and at Tidon in Celebes, by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **5** : 294–296.

1862

Catalogue of the Dipterous Insects collected at Gilolo, Ternate, and Ceram, by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **6** : 13–16, 22–23.

1864

Catalogue of the Dipterous Insects collected in Waigiou, Mysol, and North Ceram by Mr. A. R. Wallace, with Descriptions of New Species. *Jour. Proc. Linn. Soc. Lond.* **7** : 220–221, 227–229, 237–238.

1865

Descriptions of New Species of the Dipterous Insects of New Guinea. *Jour. Proc. Linn. Soc. Lond.* **8** : 116–117, 122–125.

1865

Descriptions of some New Species of Dipterous Insects from the Island of Salwatty, near New Guinea. *Jour. Proc. Linn. Soc. Lond.* **8** : 134–136.

1871

List of Diptera collected in Egypt and Arabia by J. K. Lord Esq., with descriptions of the species new to Science. *Entomologist,* **5** : 344.

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NATURAL HISTORY

PLATE 11

FIG. 1. *Sosiopsila consors* (Walker). Wing.

FIG. 2. *Adrama selecta* Walker. Wing, drawn from type of *Enicoptera rufiventris* Walker, new synonym.

FIG. 3. *Dacus* (*Paradacus*) *areolatus* Walker.

FIG. 4. *Dacus* (*Strumeta*) *biarcuatus* Walker. Wing.

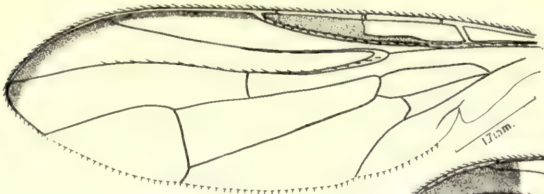
FIG. 5. *Dimeringophrys bilineatus* (Walker). Wing.

FIG. 6. *Dacus* (*Neodacus*) *curvifer* Walker. Middle section of wing of type.

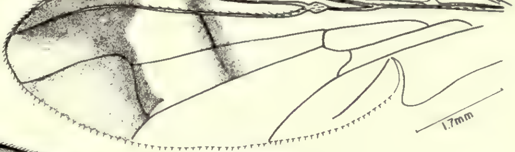
FIG. 7. *Dacus* (*Daculus*) *discipennis* Walker. Wing.

FIG. 8. *Euphranta? figurata* (Walker). Wing.

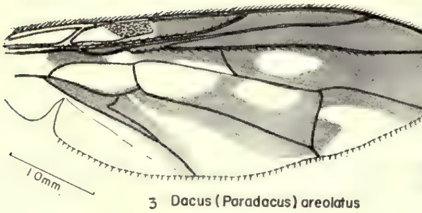
FIG. 9. *Chloropidae,* Genus? *fulvitarsis* (Walker). Wing.



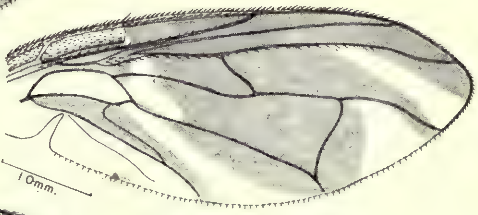
1 Sosiopsila consors



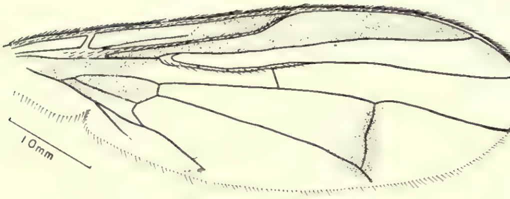
2 Abrama selecta



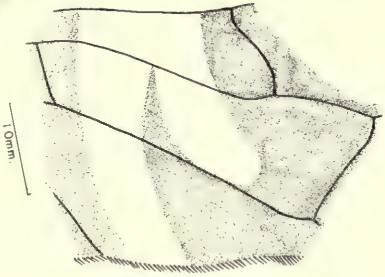
3 Dacus (Paradacus) areolatus



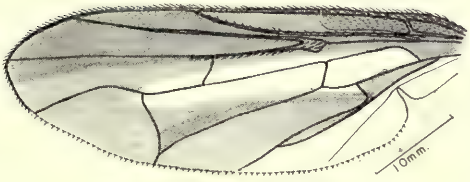
4 Dacus (Strumeta) biarcuatus



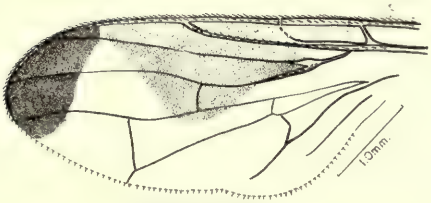
5 Dimeringophrys bilineatus



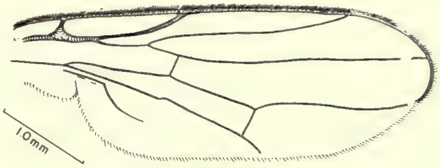
6 Dacus (Neodacus) curvifer



7 Dacus (Daculus) discipennis



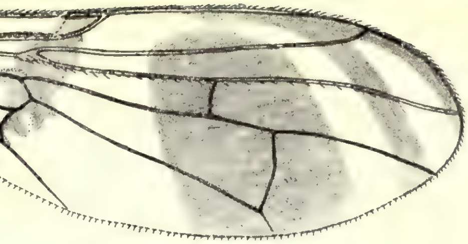
8 Euphranta figurata



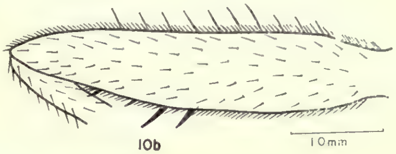
9 Chloropidae
Genus ? fulvitarsis

PLATE 12

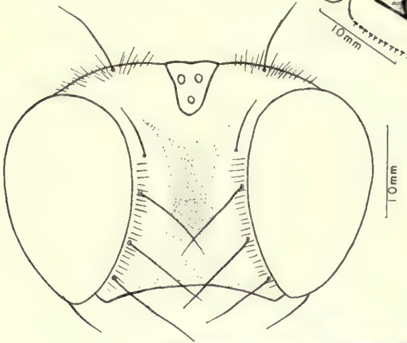
Fig. 10. *Paraeuphranta furcifer* (Walker). *a*. wing ; *b*. front femur ; *c*. head.
Fig. 11. *Dacus* (*Paradacus*) *perplexus* Walker. Wing.
Fig. 12. *Campylocera? squalida* (Walker). Wing.
Fig. 13. *Dacus* (*Zeugodacus*) *terminifer* Walker. Wing.
Fig. 14. *Neosophira arcuosa* (Walker). *a*. wing ; *b*. head.



10a Paraeuphranta furcifer



10b



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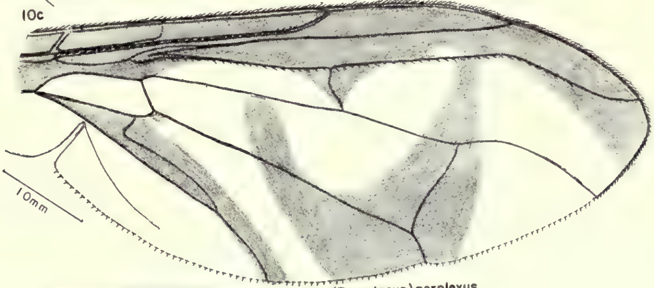
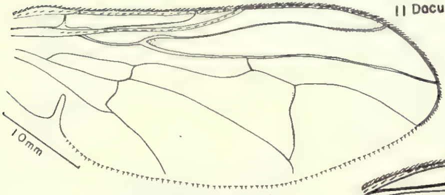
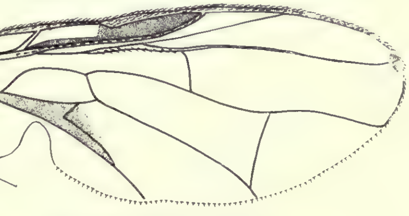


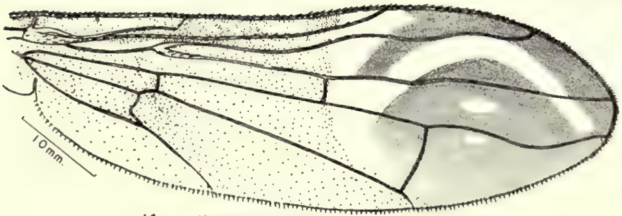
11 Dacus (Paradacus) perplexus



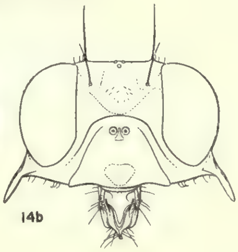
12 Campylocera squalida



13 Dacus (Zeugodacus) terminifer



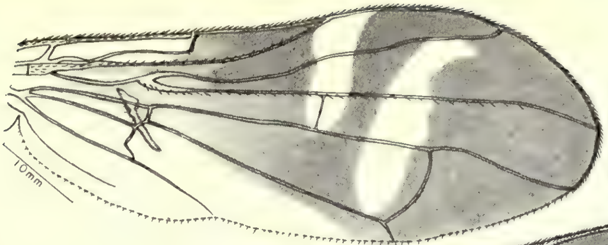
14a Neosophira arcuosa



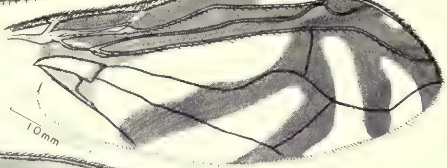
14b

PLATE 13

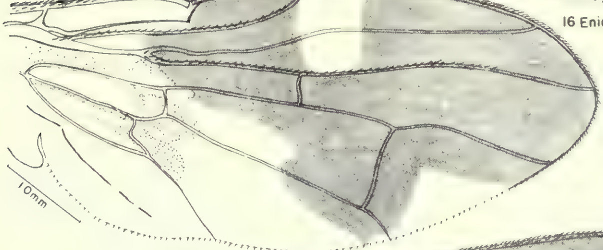
FIG. 15. *Seraca plagifera* (Walker). Wing.
FIG. 16. *Enicoptera tortuosa* Walker. Wing.
FIG. 17. *Themaroides quadrifera* (Walker). Wing.
FIG. 18. *Rioxa lanceolata* Walker. Wing.
FIG. 19. *Rioxina abbreviata* (Walker). *a.* head ; *b.* front femur ; *c.* wing.



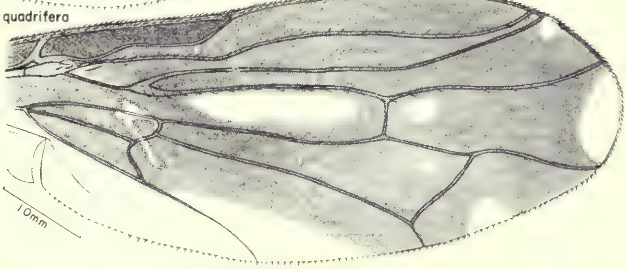
15 Seroca plagifera



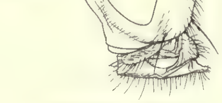
16 Enicoptera tortuosa



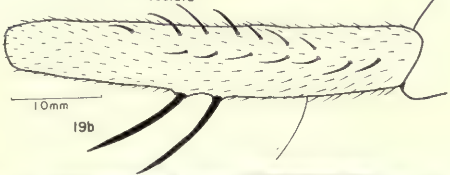
17 Themaroides quadrifera



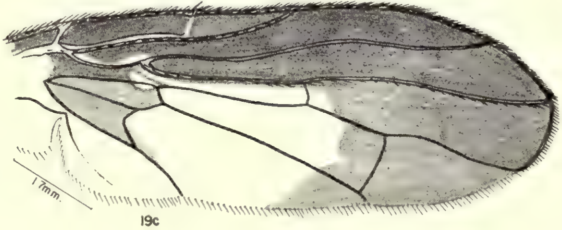
18 Rioxa lanceolata



19a Rioxina abbreviata



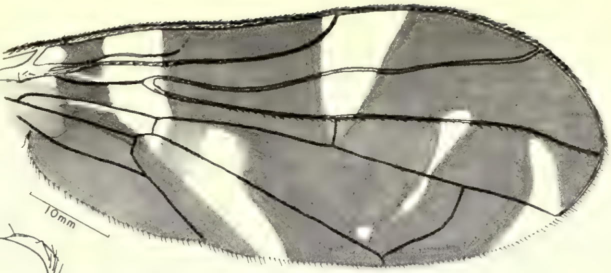
19b



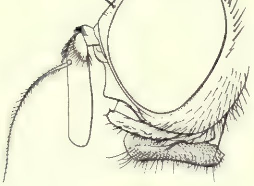
19c

PLATE 14

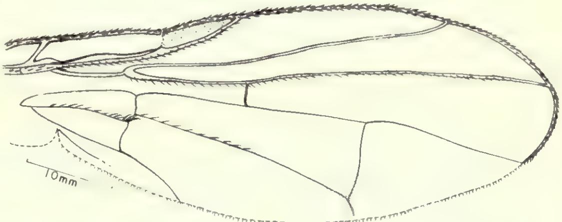
FIG. 20. *Seraca signifera* Walker. Wing.
FIG. 21. *Soita psiloides* Walker. *a*. head ; *b*. wing.
FIG. 22. *Hemilea bipars* (Walker). Wing.
FIG. 23. *Seraca concinna* (Walker). *a*. head, lateral view ; *b*. middle tarsus ; *c*. wing.
FIG. 24. *Neosophira distorta* (Walker). *a*. head, lateral view ; *b*. wing.



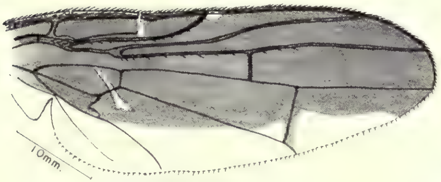
20 Seraca signifera



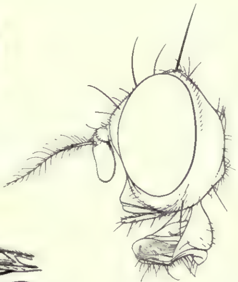
21a Soita psiloides



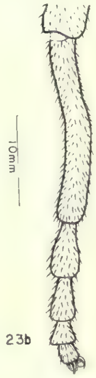
21b



22 Hemilea bipars



23a Seraca concinna



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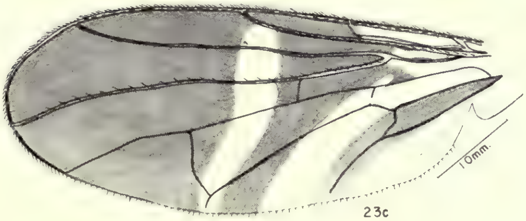

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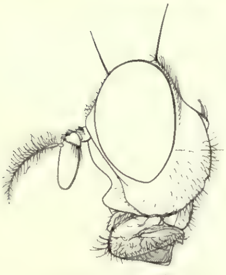
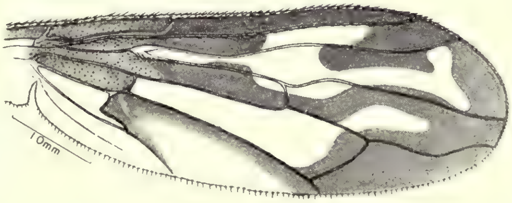


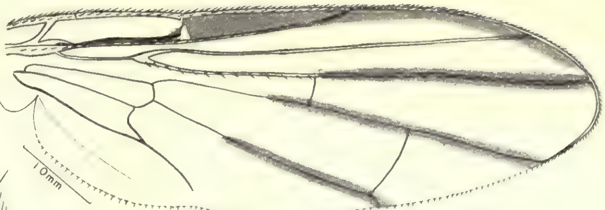
24a Neosophira distorta



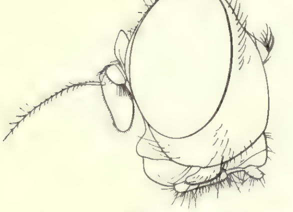
24b

PLATE 15

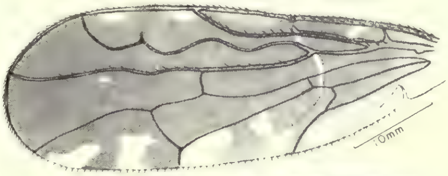
FIG. 25. *Sophira venusta* Walker. Wing.
FIG. 26. *Curvinervus walkeri* Hardy. *a*. head ; *b*. wing.
FIG. 27. *Neothemara repleta* (Walker). Wing.
FIG. 28. *Platensina amplipennis* (Walker). Wing.
FIG. 29. *Curticella approximans* (Walker). *a*. head ; *b*. wing.
FIG. 30. Genus? near *Acidia, contraria* (Walker). Wing.
FIG. 31. *Anomoia* (*Euleia*) *fossata* (Fabricius). Wing.



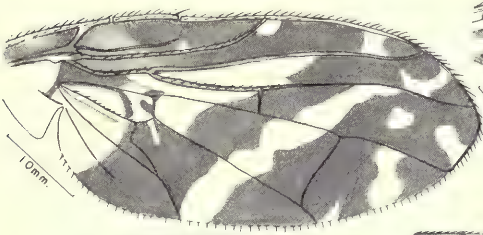
25 Sophira venusta



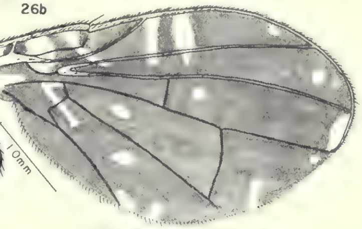
26a Curvinervus walkeri



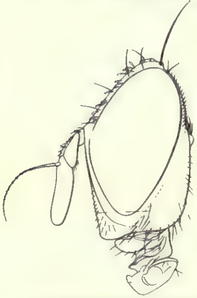
26b



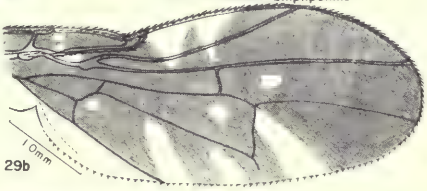
27 Neothemara repleta



28 Platensina amplipennis



29a Curticella approximans



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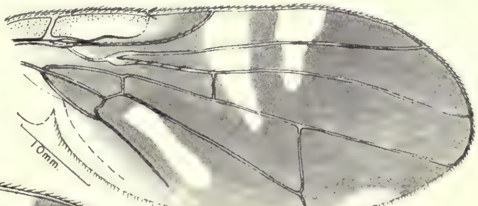
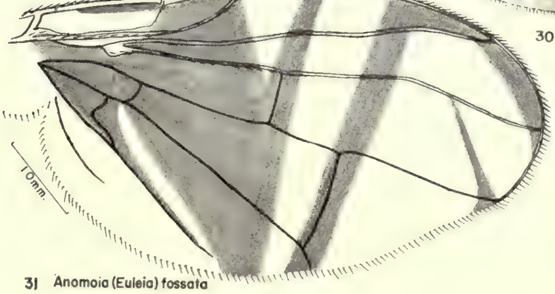


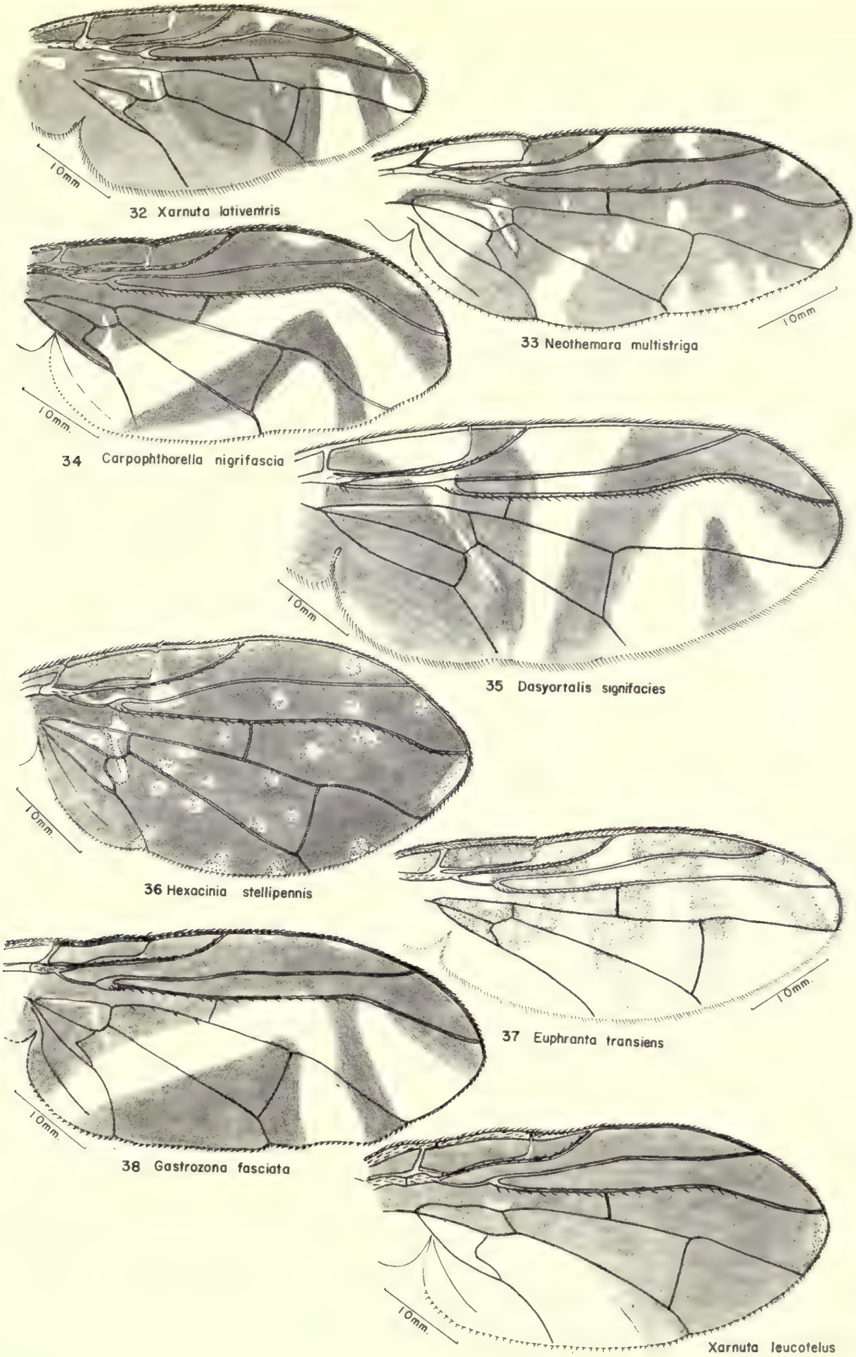
30 near Acidia contraria



31 Anomoia (Euleia) fossata

PLATE 16

FIG. 32. *Xarnuta lativentris* (Walker). Wing.
FIG. 33. *Neothemara multistriga* (Walker). Wing.
FIG. 34. *Carpophthorella nigrifascia* (Walker). Wing.
FIG. 35. *Dasyortalis signifacies* (Walker). Wing.
FIG. 36. *Hexacinia stellipennis* (Walker). Wing.
FIG. 37. *Euphranta transiens* (Walker). Wing.
FIG. 38. *Gastrozona fasciata* (Walker). Wing.
FIG. 39. *Xarnuta leucotelus* Walker. Wing.


10mm
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10mm

32 *Xarnuta lativentris*

33 *Neothemara multistriga*

34 *Carpophthorella nigrifascia*

35 *Dasyortalis signifacies*

36 *Hexacinia stellipennis*

37 *Euphranta transiens*

38 *Gastrozona fasciata*

Xarnuta leucotelus

DELPHACIDAE FROM THE LESSER ANTILLES

(HOMOPTERA : FULGOROIDEA)

R. G. FENNAH

BULLETIN OF
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ENTOMOLOGY Vol. 8 No. 6
LONDON : 1959

DELPHACIDAE FROM THE LESSER ANTILLES (HOMOPTERA : FULGOROIDEA)

BY

R. G. FENNAH xvij.
Commonwealth Institute of Entomology

Pp. 243–265 ; 9 *Text-figures*

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DELPHACIDAE FROM THE LESSER ANTILLES (HOMOPTERA : FULGOROIDEA)

By R. G. FENNAH

THIS report is concerned primarily with the Delphacidae of the Lesser Antillean archipelago in the West Indies, though opportunity is also taken to comment on a few species of interest in adjacent territories.

Only five species in this family have so far been reported from this area. In 1833 Westwood described *Delphax saccharivora* from Grenada and Barbados, and in 1907 Kirkaldy recorded the occurrence of *Peregrinus maidis* (Ashm.) in Barbados. Muir (1918) described *Delphacodes nigrifacies* and *D. mardininae* (= *D. havanensis* (Cwfd.)) from Martinique and *D. erectus nigripennis* (*nec* Cwfd.) (= *D. humilis* V. D.) from Guadeloupe. Twenty additional species are listed below, and five of them are described as new : two new species are also described from Trinidad, T.W.I.

In the Lesser Antilles the Delphacidae include a higher proportion of widespread species than do other families of Fulgoroidea, and accordingly it is possible to surmise the source and distribution of most species from the reports of Crawford (1914), Van Duzee (1907), Muir & Giffard (1924, 1926), Fennah (1945) and Caldwell & Martorell (1950), the last including the records of Osborn (1935).

The survey by Caldwell & Martorell of the Puerto Rican Delphacidae is useful in indicating possible gaps in the Lesser Antillean collection. The latter, which consists almost entirely of material taken by the writer, was built up from samples collected in a small number of localities which, even in sum, do not satisfactorily represent the full ecological range of Delphacid habitats in each island. Only in St. Lucia was sampling satisfactory in this respect, but even there it was inadequate with reference to possible seasonal change of population. Nevertheless, as shown in the tabular synopsis of distribution of species, the more extensive collecting in this island resulted in a more comprehensive list.

The fulgoroid faunas of the principal islands of the Lesser Antillean archipelago tend to be similar, though modified by impoverishment in South American elements northward and a more gradual impoverishment in Central American and Greater Antillean elements southward. Thus, within limits, it is reasonable to infer the presence of certain genera in islands where they have not yet been reported.

The columns in the distributional synopsis of Delphacidae are arranged from left to right in the same order as the islands (except Antigua) occur from south to north, so that it can readily be seen which omissions are most probably attributable to incomplete collecting : among the most obvious are those of *Peregrinus maidis* (Ashm.) from the Montserrat list, *Delphacodes teapae* Fowl. from the Grenada list, and of *Saccharosydne saccharivora* (Westw.) and of *Punana* from the St. Vincent and Nevis lists respectively.

The species of *Eucanyra* (or *Ugyops*), *Punana* and *Burnilia* known to the writer are found in forest associations, and do not normally feed on grasses. Whereas *Punana* was taken in fair numbers, and *Burnilia* sparsely, and others of each were seen but not captured, no example of *Ugyops* has been found in the Lesser Antilles. Two species occur in Puerto Rico, and one in Trinidad, this being clearly related to one of the Puerto Rican species. In this particular genus it is not warrantable to assume that *Ugyops* is present in the intervening islands, as exploration of its potential habitat has been fairly thorough.

Distributional List of Lesser Antillean Fulgoroidea

	Trinidad	Grenada	St. Vincent	St. Lucia	Dominica	Montserrat	Nevis	St. Kitts	Antigua	Jamaica	Other areas
Ugyops flagellata Fenn.	×										
*Punana dolon**						×		×			
*P. dominicana**					×						
Burnilia spinifera Fenn.	×		×		×						
Stobaera sp.				×							
Saccharosydne saccharivora Westw.	×	×		×						×	Barbados.
S. ornatipennis Muir				×							Brazil.
Neomalaxa flava Muir	×			×	×						Puerto Rico, Brazil.
Peregrinus maidis (Ashm.)	×	×	×	×	×		×	×	×	×	Barbados.
Pissonotus brasilensis Muir				×							Brazil.
Phrictopyga contorta (Muir)										×	Brazil, Puerto Rico.
*P. semele**	×										
*P. nugax**	×										
Euidella afasciata C. & M.				×							Puerto Rico.
Chloriona kolophon Kirk.				×		×				×	Widespread.
C. wallacei Muir					×					×	Cuba, Br. Honduras.
C. cubana Cwfd.				×							Venezuela, Cuba.
Delphacodes humilis V. D.						×				×	Guadeloupe.
D. albinotata (Cwfd.)					×						Mexico.
D. axonopi Fenn.	×			×							
D. balboae M. & G.				×							Mexico, Ecuador, Br. Guiana.
D. havanae M. & G.	×									×	Cuba, Guatemala, Br. Guiana.
D. havanensis Cwfd.				×						×	Martinique, Cuba, Puerto Rico.
D. propinqua Fieber	×	×	×	×	×	×					Widespread.
D. floridae M. & G.						×					Florida.
D. teapae Fowl.	×		×	×	×	×					Ecuador to southern U.S.A.
D. nigrifacies Muir			×	×	×	×					Martinique, Costa Rica, Br. Guiana.
*D. venilia**						×					
*D. philyra**				×							
*D. iaxartes**				×							

(* Described below as new.)

Two species described from Venezuela by Lethierry, *Araeopus conspersinervis* and *Dichoneura simoni*, stated to be akin to *Delphax*, are still unplaced in genera as currently recognized in this family. The first is dealt with below: *Dichoneura*, on the other hand, has no place in the Delphacidae. A specimen standing under this name in the Lethierry collection in the Paris Museum agrees with the original description, and is a tropiduchid closely allied to the Colombian *Cixius rufimacula* Wlk. and also close to, and possibly congeneric with, *Colgorma diluta* (Stål).

Key to Subfamilies and Tribes of Lesser Antillean Delphacidae

1. Post-tibial spur subulate or spine-like, devoid of lateral teeth . . . Asiracinae

– Post-tibial spur with teeth on posterior margin (Delphacinae *pars*) 2

2. Post-tibial spur convex on both sides, occasionally flattened on one surface, marginal teeth not exceeding 17 . . . . Alohini

– Post-tibial spur concave on one surface, marginal teeth commonly exceeding 17 Delphacini

Subfamily Asiracinae

Key to West Indian Genera of Asiracinae

1. Antennae long, both segments broad, flattened and foliaceous . . *Copicerus* Swartz

– Antennae not foliaceous 2

2. Antennae long, narrowly cylindrical, frons elongate . . *Ugyops* Guérin-Méneville

– Antennae not long or not cylindrical, frons rather broad 3

3. Frons with two carinae enclosing a median area; antennae not compressed *Pentagramma* Van Duzee

– Frons ecarinate or with a feeble median carina, antennae laterally compressed *Punana* Muir

Genus *UGYOPS* Guérin-Méneville

Guérin-Méneville, 1834, *Voy. aux Indes Belanger*, **1**: 477. Haplotype, *Ugyops percheronii* Guérin-Méneville, *ibid.*: 478.

After examining material of this genus from almost all parts of its tropical range, the writer considers that the current division of the natural group of Central American species into three full genera, *Ugyops*, *Eucanyra* and *Epibidis*, is unwarranted.

Ugyops flagellata (Fennah)

Eucanyra flagellata Fennah, 1945, *Proc. U.S. nat. Mus.* **95**: 426.

Anal segment about twice as long as broad, telson scarcely one-third as long as anal segment. The longer aedeagal spinose process comparatively stout, not filamentous.

Two ♂, 1 ♀, Trinidad, T.W.I., Central Experiment Station, near Arima, La Réunion section Mar. 1950, R. G. Fennah, in cacaofield. The most distinctly marked of these specimens has a frons with nine pale round spots on each side of the median carina, and four pale round spots near each lateral margin in the distal half; the clypeus is stramineous except apically, where it is fuscous. Caldwell & Martorell list three species from Puerto Rico, *U. osborni* Metc., *U. occidentalis* Muir and *U.*

isolata C. & M.; the more obvious differences between these species and *U. flagellata* are as follows. In *U. flagellata* the median carina of the frons is single and sharply defined in its distal half, and single, though broadening basad, in its basal half; even near the base of the frons no concavity is developed in the raised median area. The shape of the head in profile is near to that of *U. occidentalis*, as is also the tegminal coloration, but the markings on the frons are quite different. The genitalia do not agree precisely in any one feature with those of any of the Puerto Rican species, and the only close similarity which exists is in the aedeagal structure of *U. flagellata* and *U. osborni*. The genital styles of *U. flagellata* resemble those of *U. osborni*, and differ from those of the other two species in so far as they are produced caudad in a lobe at their base. This appears as a quadrate projection when the style is viewed from the side.

Genus ***PUNANA*** Muir

Muir, 1913, *Proc. Hawaii ent. Soc.* **2** : 249. Orthotype, *Punana brunnea* Muir, 1913, loc. cit.: 249.

Punana dominicana sp. n.

(Text-fig. 1, A–D)

Width of vertex across basal margin slightly greater than twice length in middle line to apex of head.

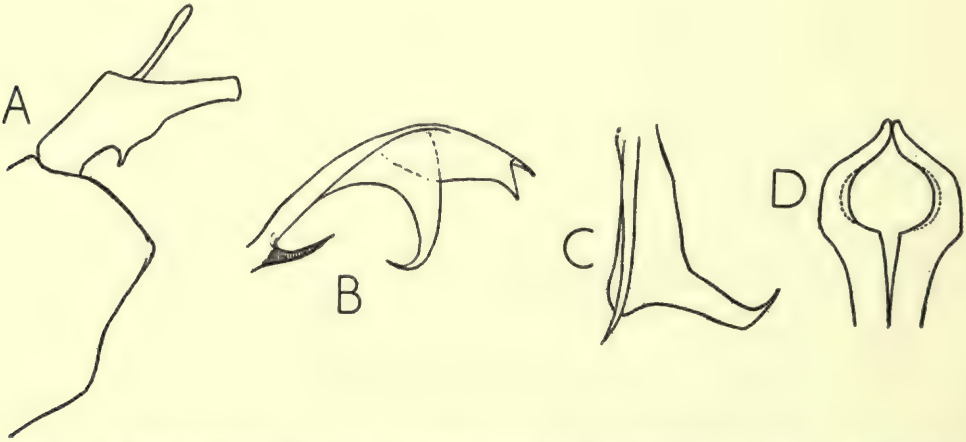

FIG. 1. *Punana dominicana* sp. n.: A, pygofer and anal segment, left side ; B, aedeagus, distal portion, right side ; C, aedeagus, distal portion, dorsal view ; D, genital styles.

Frons with lateral margins diverging from base to level of antennae, thence incurved to frontoclypeal suture, length in middle line about equal to width at widest part. Pronotum in middle line about as long as vertex.

Yellowish-testaceous ; distal two-thirds of frons and lower surface of body, except genitalia, ivory-white to stramineous. Two shallowly arcuate transverse marks on vertex, median area and lateral margins of clypeus, antennae in part, a spot on femora at apex, two spots on protibiae and mesotibiae, and three on post-tibiae, and all tarsi at base, fuscous. Tegmina hyaline, faintly tinged with yellow, veins concolorous, heavily studded with fuscous granules, each bearing a fuscous seta, a linear mark at middle of commissural margin of clavus, a small suffusion near the apical angle and another near the anal angle, and a spot on M at nodal line, fuscous. Wings hyaline.

Anal segment of male moderately short, asymmetrical, with right lower margin feebly sinuate, left lower margin produced ventrad at middle in a delicate spinose process. Pygofer very slightly asymmetrical, lateral margins angulately produced caudad. Aedeagus narrowly tubular and shallowly curved in basal half, produced on right near junction with flagellum in a thin triangular lobe ; flagellum comprising a pigmented process from which depends on the right side a pellucid lamina not quite extending to its tip ; an unpigmented lamina on left side of flagellum strongly produced to left apically in a tapering flattened process, directed ventrad on lower surface of flagellum near its middle. Genital styles sinuate, broadest in basal half, shaped as figured.

Male : length, 4·5 mm.; tegmen, 5·0 mm. Female : length, 5·1 mm.; tegmen, 5·0 mm.

Holotype male and 3 ♂ and 6 ♀, Dominica, T.W.I., Greenhill Estate, June 1940, R. G. Fennah. This species is distinguished by the bold fuscous and brown markings and by the shape of the male genitalia. It seems to be nearest to *P. caribbensis* Caldwell & Martorell, but differs in the shape of the genital styles. In the aedeagus the elements are approximately similar but are reversed—the long apical lateral extension is definitely to the left side, not to the right. The right apical process is porrect, not decurved. The anal segment is differently shaped from that of *P. caribbensis.*

Punana dolon sp. n.

(Text-fig. 2, A–D)

Width of vertex across basal margin exactly twice length in middle line to apex of head. Frons with lateral margins diverging from base to above level of antennae, then feebly converging for some distance, finally strongly incurved to suture, length in middle line equal to or slightly exceeding maximum width. Pronotum in middle line slightly shorter than vertex.

Stramineous ; yellowish-brown on basal half of frons and anterior surface of antennae. Faint yellowish-brown markings on vertex and mesonotum as in *P. dominicana.* Lower surface of body, including clypeus and male genitalia, pallid ; banding on legs as in *P. dominicana,* but faint. Tegmina yellowish-hyaline, veins concolorous, granules narrowly outlined with yellowish-brown. Wings hyaline with veins concolorous.

Anal segment of male moderately short, bilaterally symmetrical or practically so, lower margin in side view concave basally and deeply convex distally. Pygofer with each lateral margin broadly produced caudad in a convex lobe. Aedeagus narrowly tubular and shallowly curved in basal half, produced laterad in a rounded lobe near junction with flagellum ; flagellum comprising a tapering curved pigmented process, from which a pellucid membrane hangs down along the right side as far as the apex, though a little separated from the pigmented portion near its tip ; on left side the pigmented process is produced to left distally in a parallel-sided transparent process which is truncate apically where it bears a pair of slender reflexed spinose processes. Genital styles sinuately curved, broadest in basal half, shaped as in figure.

Male : length, 4·4 mm.; tegmen, 3·9 mm.

Holotype male, St. Kitts, T.W.I., Sept. 1943, R. G. Fennah.

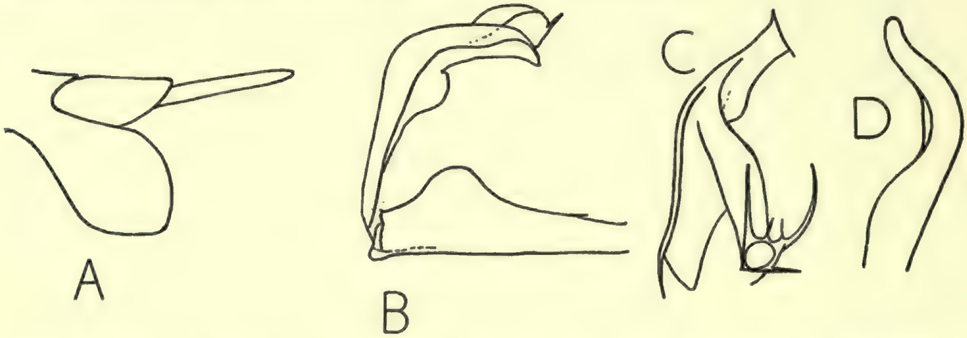

FIG. 2. *Punana dolon* sp. n.: A, anal segment, left side ; B, aedeagus, right side ; C, aedeagal flagellum, dorsal view ; D, right genital style, posterior view.

This species differs from *P. dominicana* in the proportions of the frons and vertex, and in the shape of every element of the male genitalia. It would seem to belong to the *P. caribbensis* group but cannot be confused with any other species. A single female from Montserrat, T.W.I. (Jan. 1939, R. G. Fennah) has the same cephalic proportions as the male from St. Kitts and is provisionally assigned to this species. The ground coloration is similar to that of the St. Kitts male, but all the brown coloration is a little darker, though not nearly so dark as in *P. dominicana*.

Subfamily DELPHACINAE

Tribe ALOHINI

KEY TO THE ALOHINI OF THE NEW WORLD

1. Antennae with basal segment cylindrical, long or short 2
– Antennae with basal segment more or less flattened 3
2. Vertex four times as wide as long. Antennae with basal segment little, if any, longer than broad . . . . *Synpteron* Muir
– Vertex not wider than long. Antennae with basal segment much longer than broad *Burnilia* M. & G.
3. Antennae with basal segment long, narrow, parallel-sided, with a longitudinal carina *Sparnia* Stål
– Antennae with basal segment subtriangular or sagittate . . . . *Stobaera* Stål

Genus *BURNILIA* Muir & Giffard

Muir & Giffard, 1924, *Hawaii Sug. Pl. Ass. ent. Bull.* **15** : 7. Orthotype, *Delphax pictifrons* Stål.

Burnilia pictifrons (Stål)

Delphax pictifrons Stål, 1864, *Stett. ent. Zeit.* **25** : 50.

One ♂, 3 ♀, Venezuela, E. Zulia, Perija, Rio Negro, Kumana Hoya, 600 m., 20th Dec., 1950, La Salle.

Burnilia spinifera Fenn.

Fennah, 1945, *Proc. U.S. nat. Mus.* **95** : 429.

Burnilia spinifera antillana ssp. n.

(Text-fig. 3, A, B)

Vertex longer in middle line than broad at base (1·3 : 1), base twice as broad as apex, lateral margins straight, apex projecting markedly beyond eyes, base posterior to middle of eyes. Frons longer than broad at apex (1·8 : 1), basal two-thirds of lateral margins straight, diverging, slightly arcuate on apical third, disc slightly concave in middle, median carina simple, distinct ; median carina of clypeus prominent. Antennae reaching approximately to apex of clypeus, second segment longer than first (2·6 : 1). Post-tibial spur with 15–17 teeth.

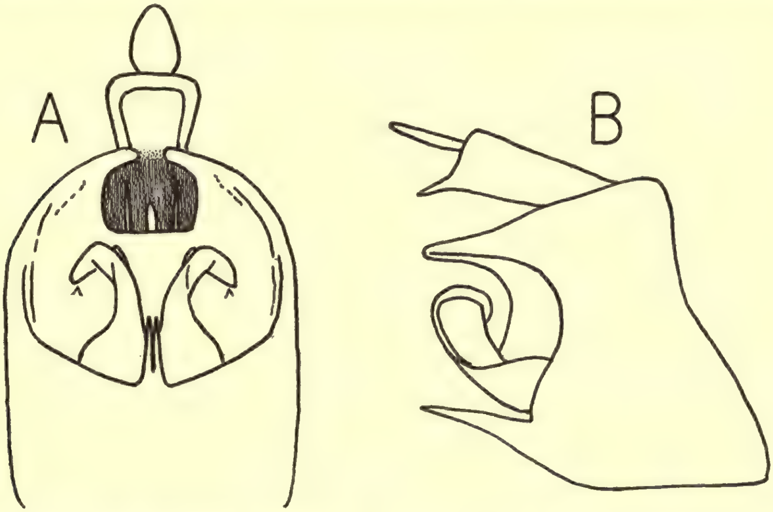

FIG. 3. *Burnilia spinifera antillana* ssp. n.: A, male genitalia, posterior view ; B, the same, right side.

Stramineous ; lateral margins of vertex and frons narrowly piceous, frons traversed medially by a white band which is bordered basally and apically with piceous, the basal piceous band wider than the apical ; a white spot, bordered fuscous-piceous, on each lateral pronotal lobe ; second antennal segment dark on anterior surface, a small dark mark at apex of all femora. Tegmina hyaline, slightly tinged yellowish, veins concolorous. Wings hyaline with concolorous veins.

Anal segment of male rather short, a little deflexed apically, anal foramen at apex, apical margin transverse. Pygofer long, laterodorsal angles each strongly produced caudad for more than length of anal segment, narrowly rounded distally, lateral margins sinuate, weakly convexly produced at middle ; medioventral process long, parallel-sided, deeply bifid ; diaphragm extensive, dorsal margin short, subrectangulately excavate, with a straight slender spinose process arising on each side of middle, directed dorsad ; lateroventrally a small slender spine, lying almost anterior to genital styles, directed dorsocaudad. Genital styles moderately long, rather broad, laterally compressed, strongly curved in side view, in posterior view apposed basally then diverging, moderately decurved at apex and bluntly pointed, a spinose process arising mesodorsally curved almost parallel with apical portion of style. Aedeagus very slender, cylindrical at least in distal part where it lies against diaphragm, acuminate at apex.

Male : length, 4·7 mm.; tegmen, 4·1 mm. Female : length, 4·9 mm., tegmen, 5·1 mm.

Holotype male of subspecies and 2 ♀, St. Vincent, T.W.I., Morne Garu, Aug. 1941, R. G. Fennah, on *Heliconia* sp. This subspecies differs from the typical subspecies in minor points of coloration, and markedly in the male genitalia, where the upper lateral spines on the diaphragm are absent (present in the typical subspecies) and, the genital styles are rounded at the apex, not obliquely truncate. One female, Dominica, T.W.I., Saltoun, May 1941, R. G. Fennah, is assigned to this species.

Burnilia belemensis Muir

Muir, 1926, *Hawaii Sug. Pl. Ass. ent. Bull.* **18** : 5.

One ♀, 5 nymphs, Venezuela, Yaracuy, Marin, 125 m., 6th July, 1951, H. E. Box. The clypeus and mesonotum of the adult are lighter in hue than the coloration given for the typical population.

Genus ***SPARNIA*** Stål

Stål, 1862, *Handl. svensk. Vet. Akad.* **3** (6) : 6. Haplotype, *Sparnia praecellens* Stål.

Sparnia praecellens Stål

Stål, 1862, *Handl. svensk. Vet. Akad.* **3** **(6)** : 6.

Three ♀, Venezuela, E. Zulia, Perija, Rio Negro, Kumana Hoya, 1, 100 m., 22nd Dec., 1950, La Salle.

Genus ***STOBAERA*** Stål

Stål, 1859, *Berl. ent. Z.* **3** : 327. Haplotype, *Delphax concinna* Stål, 1854, *Öfvers. vetensk Akad. Förh., Stockh.* **11** : 246.

Osborn has reported *Stobaera tricarinata* Say from Cuba (1926, *Sci. Contr. Trop. Pl. Res. Found.* **2** : 358) and from Puerto Rico (1929, *J. Dept. Agric. P.R.* **13** : 110), but Caldwell & Martorell were unable to confirm the latter. The presence of a species of the genus in St. Lucia, however, lends a little support to the Puerto Rican record.

Stobaera sp.

(Text-fig. 4, A, B)

Median carina of frons not forked, nor thickened basally. Frons not quite as broad at base as at apex, lateral margins parallel, frons narrowed between eyes. Eyes reniform, deeply excavate. Antennae with basal segment about as long as second, and fully twice as broad as second. Post-tibial spur with five teeth on margin.

Apex of clypeus, rostrum, mesoscutellum, fore and middle legs distad of trochanters, hind legs entirely, and anal segment of female pallid cream or white. Remainder of head and body more or less uniformly testaceous, tinged with red, antennae, basal margin of frons, apical margin of vertex and a W-shaped band across middle of vertex darker than remainder. Tegmina with granulation concolorous with veins, corium yellowish-testaceous, transparent, a suffusion along costal margin to node, fuscous, membrane fuscous except for a rounded-triangulate area between node, M_{3+4} and apical angle ; veins concolorous. Wings hyaline with faintly stramineous veins.

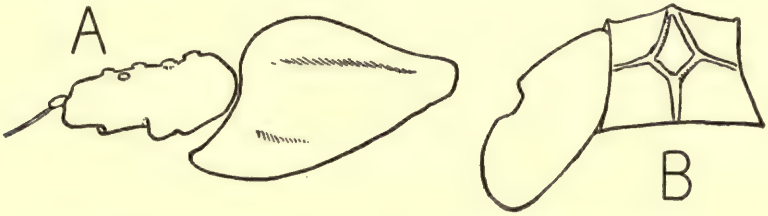

FIG. 4. *Stobaera* sp.: A, antenna ; B, vertex and left eye.

Female : length, 3·4 mm.; tegmen, 3·6 mm.

One ♀, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah. This appears to differ from all described species by its coloration and by the number of teeth on the post-tibial spur. It is preferable that it should remain unnamed until the genitalia of a male can be examined, and the description be amplified.

In 1890 Lethierry described a delphacid from Venezuela under the name *Araeopus conspersinervis* (Lethierry, 1890, *Ann. Soc. ent. Fr.* (**6**) **10** : 151). His description is brief, and the generic assignment implies the presence of antennae like those of the European *D. crassicornis* Panz. In the known delphacid fauna of the circum-caribbean area only *Punana* and *Stobaera* and *Neoperkinsiella* have such antennae, and only the first two have tegmina with pallid veins bearing dark granules. Of these only *Stobaera* has a tricarinate mesonotum and tegmina reaching far beyond the apex of the abdomen. The original description cites the frons as being tricarinate: this is here taken to mean that the lateral margins are carinate in the same manner and degree as the median carina. The generic characters of *Stobaera* alone fit the description given, and it must be considered possible that *A. conspersinervis* is a member of this genus.

Tribe DELPHACINI

KEY TO THE DELPHACINI OF THE LESSER ANTILLES

1. Antennal segments each with a longitudinal black stripe. Aedeagus short, with a very long, slender coiled subfilamentous appendage 2
– Antennal segments devoid of such a stripe. Aedeagus tubular, even if narrow; appendage, if present, not coiled and not very long 3
2. Antennae reaching to frontoclypeal suture, second segment longer than first *Saccharosydne* Kirk.
– Antennae reaching to apex of clypeus, segments of equal length . . *Neomalaxa* Muir.
3. Head with eyes distinctly narrower than pronotum, so that outline of body tapers strongly cephalad from base of tegmina. Frons with median carina forked some distance before base 4
– Head with eyes not or only little narrower than pronotum; bodily outline only weakly tapering cephalad from base of tegmina. Frons with median carina simple, or forked very close to base, only rarely forked between eyes 5
4. Postfemora only as long as post-tibiae from base to second lateral spine. Antennae pale, with segments dark at base and at apex . . . . . *Peregrinus* Kirk.
– Postfemora clearly surpassing second lateral spine of post-tibiae, not much less than total length of post-tibiae. Antennae fuscous . . . . . *Pissonotus* Van Duzee
5. Basal metatarsal segment longer than second and third together. Profemora considerably longer than procoxae . . . . *Euidella* Puton
– Basal metatarsal segment not or only little longer than second and third. Profemora only a little longer than procoxae 6
6. Vertex a little longer than broad. Head and thorax usually with a white median dorsal stripe. Lateral carinae of pronotum straight, reaching hind margin *Chloriona* subg. *Sogatella* Fenn.
– Vertex not longer than broad, no white medial stripe on head and thorax. Lateral carinae of pronotum curved, not reaching hind margin . . *Delphacodes* Fieber

Genus ***SACCHAROSYDNE*** Kirkaldy

Kirkaldy, 1907, *Hawaii Sug. Pl. Ass. ent. Bull.* **3** : 139. Orthotype, *Delphax saccharivora* Westw

Saccharosydne saccharivora (Westw.)

Delphax saccharivora Westwood, 1833, *Mag. nat. Hist.* **6** : 413.

One ♂, Jamaica, T.W.I., Hope, Mona House, Nov. 1940, R. G. Fennah. One ♂, 1 ♀, Grenada, T.W.I., Oct. 1943, R. G. Fennah. Two ♀, St. Lucia, T.W.I., Mar. 1939, R. G. Fennah. Urich (Urich, 1912, *West Indian Bulletin*, **12** : 390) recorded this species (as *Stenocranus saccharivora*) in Trinidad, and the writer has confirmed its presence. Four mutilated specimens, Venezuela, Tacarigua, Carabobo, 420 m., P. Guagliumi, May 1950; Carabobo, Urama 20 m., 17th Aug., 1950, H. E. Box.

Saccharosydne ornatipennis Muir

Muir, 1926, *Hawaii Sug. Pl. Ass. ent. Bull.* **18** : 14.

One ♀ and one mutilated specimen, St. Lucia, T.W.I., Roseau, 4th Sept., 1935, H. E. Box. These interesting captures were seen by the writer in St. Lucia in 1936 and are now in the British Museum. They agree well in the structure of the head and in the venation with two of Muir's series from Brazil.

Genus ***NEOMALAXA*** Muir

Muir, 1918, *Proc. Hawaii ent. Soc.* **3** : 426. Haplotype, *Neomalaxa flava* Muir.

Neomalaxa flava Muir

Muir, 1918, *Proc. Hawaii ent. Soc.* **3** : 427.

Post-tibial spur with 15 or 16 teeth.

Twenty-five ♂, 29 ♀ and 38 nymphs, St. Lucia, T.W.I., Quilesse, 21st Feb., 1941, R. G. Fennah, abundant on grass. Fifteen ♂, 18 ♀ and 64 nymphs, Dominica, T.W.I., June 1939, R. G. Fennah. Muir (Muir, 1926, *Hawaii Sug. Pl. Ass. Ent. Bull.* **18** : 15) has reported this species from Trinidad. One mutilated specimen, Venezuela, Maracay, 450 m., 12th Dec., 1949, H. E. Box.

Genus ***PEREGRINUS*** Kirkaldy

Kirkaldy, 1904, *Entomologist,* **37** : 175. Orthotype, *Delphax maidis* Ashmead.

Peregrinus maidis (Ashm.)

Delphax maidis Ashmead, 1890, *Psyche,* **5** : 323.

Two ♂, 5 ♀, Grenada, T.W.I. Oct. 1943, R. G. Fennah ; 2 ♂, 7 ♀ and 31 nymphs, St. Vincent, T.W.I., Agricultural Station, Mar. 1941, R. G. Fennah ; 2 ♂ 8 ♀ and 1 nymph, St. Lucia, T.W.I., May 1939, R. G. Fennah ; 1 ♂, Dominica, T.W.I., July 1939, R. G. Fennah ; 34 ♂, 51 ♀ and 15 nymphs, Antigua, T.W.I., Aug. 1945, R. G. Fennah ; 10 ♂, 16 ♀, Nevis, T.W.I., 16th Jan., 1942, R. G. Fennah ; 20 ♂, 35 ♀ and 150 nymphs, St. Kitts, T.W.I., Basseterre, 7th Sept., 1943, R. G. Fennah on sorghum ; 4 ♂, 3 ♀, Jamaica, T.W.I., Hope, Mona House, Nov. 1940, R. G. Fennah.

Genus ***PISSONOTUS*** Van Duzee

Van Duzee, 1897, *Bull. Buff. Soc. nat. Sci.* **5** : 236. Orthotype, *Pissonotus marginatus* Van Duzee, loc. cit. : 236.

Pissonotus brazilensis Muir

Muir, 1926, *Hawaii Sug. Pl. Ass. ent. Bull.* **18** : 19.

Five ♂, 4 ♀, St. Lucia, T.W.I., May 1939, R. G. Fennah.

Genus ***PHRICTOPYGA*** Caldwell

Caldwell & Martorell, 1950, *J. Agric. Univ. P.R.* **34** : 170. Orthotype, *Kelisia contorta* Muir.

Phrictopyga contorta (Muir)

Kelisia contorta Muir, 1926, *Hawaii Sug. Pl. Ass. ent. Bull.* **18** : 24.

Post-tibial spur with about 24 teeth, not 13 to 16 as in type series.

One ♂, Jamaica, T.W.I., Mona House, Nov. 1940, R. G. Fennah. The genus extends eastward to Puerto Rico, but no representative has yet been found in the Lesser Antilles.

Phrictopyga semele sp. n.

(Text-fig. 5, A–E)

Head with eyes distinctly narrower than pronotum. Vertex longer than broad at base (1·2 : 1), apical margin transverse, a little produced at middle, basal margin level with middle of eyes, fully as wide as an eye in same line. Frons twice as long as broad, slightly broader at apex than at base, lateral margins shallowly convex ; antennae reaching to base of clypeus, first segment scarcely longer than broad, second segment twice as long as first. Pronotum with lateral carinae straight, diverging caudad, nearly but not quite attaining hind margin. Basal metatarsal segment longer than second and third together, spur about half as long as basal metatarsal segment, rather narrow, with about 20 teeth on posterior margin.

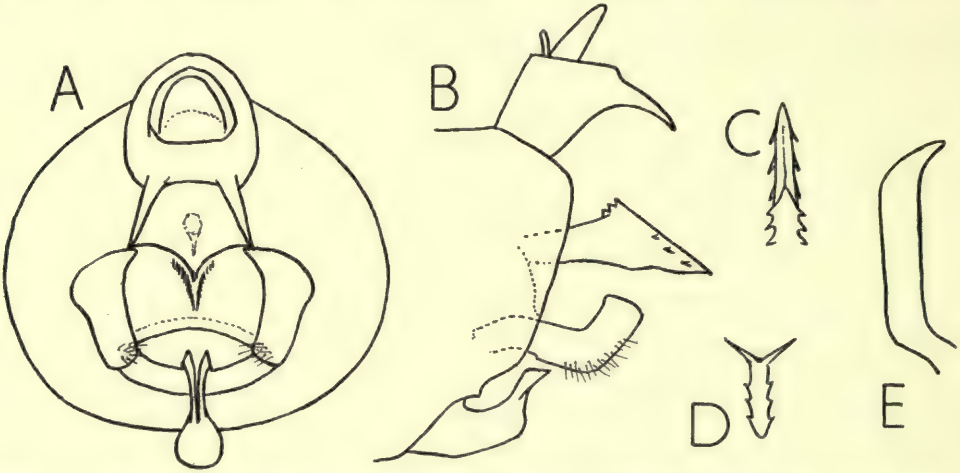

Fig. 5. *Phrictopyga semele* sp. n.: A, male genitalia, posterior view ; B, the same, left side ; C, apex of aedeagus, dorsal view ; D, the same, posterior view ; E, apical half of left genital style, ventral view.

Pallid stramineous ; vertex, pronotum and mesonotum medially creamy-white ; intercarinal areas of frons, a stripe on each side bordering pallid median band of pronotum and mesonotum, and three spots on each side of pronotum laterad of discal carinae, testaceous-fuscous. Tegmina hyaline, slightly tinged yellow, a dilute fuscous mark overlying each apical vein at margin. Wings hyaline, veins concolorous.

Anal segment short, ring-like, apical margin shallowly concave, lateroapical angles strongly produced laterocaudad and ventrad in a pair of stout spines. Posterior opening of pygofer distinctly broader than long, anal emargination not deep, laterodorsal angles not produced, lateral margins shallowly convex, ventral margin medially produced dorsocaudad in a narrowly triangular process shortly bifurcate at its apex, diaphragm rather large and deep, pigmented in median portion which is biconvex on its dorsal margin and is acutely produced caudad in its middle line. Aedeagus not long, laterally compressed, in side view with ventral margin longer than dorsal, a flange dorsally on each side bearing three teeth, a row of three widely-spaced teeth along oblique apical margin ; orifice terminal on lower surface. Genital styles rather narrow and directed laterocaudad in basal half, broader and directed dorsad in apical half, apical margin convex-truncate with inner angle acute, outer angle obtusely rounded.

Male (macropterous) : length, 2·6 mm.; tegmen, 2·8 mm. Female (macropterous) : length, 3·0 mm.; tegmen, 4·0 mm.

Holotype male and 4 ♂ and 3 ♀, Trinidad, T.W.I., St. Augustine, Apr. 1934, R. G. Fennah, on *Axonopus compressus*. This species is near *P. fuscovittata* (Muir) but differs in the shape of the spines on the anal segment, of the aedeagus, and of the genital styles. The post-tibial spur has fewer teeth than *fuscovittata*, which has 25 to 27.

Phrictopyga nugax sp. n.

(Text-fig. 6, A–F)

Head with eyes distinctly narrower than pronotum. Vertex longer than broad at base (about 1·5 : 1), basal margin about as broad as apex, apical margin sinuately transverse, slightly produced at middle, basal margin just distad of middle of eyes, as wide as an eye in same line. Frons longer than broad (about 2·3 : 1), slightly broader at apex than at base, lateral margins shallowly convex. Antennae reaching slightly beyond base of clypeus, first segment distinctly longer than broad, second segment longer than first (about 1·5 : 1). Pronotum with lateral carinae straight, diverging caudad, almost but not quite reaching hind margin. Basal metatarsal segment longer than second and third together, spur about three-quarters of length of basal metatarsal segment, narrowly triangular, with 21–25 teeth.

Pallid stramineous ; vertex, pronotum and mesonotum medially, creamy-white ; intercarinal areas of frons and clypeus and anterior part of genae and a mark in each field of pronotal disc fuscous ; abdomen dorsally castaneous, except along middle line ; abdomen ventrally, pygofer and genital styles lighter castaneous. Tegmina hyaline, a mark between M and Cu to apex, a linear mark in clavus at base and a mark near apex of commissural margin of clavus, dilute fuscous. Wings hyaline, veins concolorous.

Anal segment short, ring-like, apical margin transverse, devoid of spinose ornamentation. Posterior opening of pygofer a little longer than broad, anal emargination moderately large, laterodorsal angles only feebly produced, lateral margins in side view feebly triconcave, ventral margin medially produced dorsocaudad in a broadly triangular process, acute at its apex, not bifid; diaphragm rather broad, pigmented throughout its median portion, dorsal margin evenly and shallowly convex. Aedeagus narrowly cylindrical, slightly compressed laterally, directed caudad, eight or nine teeth forming a double row on ventral margin below orifice which lies on left dorsally. Genital styles moderately long, sickle-shaped, almost parallel-sided at base, then strongly curved laterad then mesad, and feebly recurved a little at bluntly pointed apex.

Male (macropterous): length, 3·0 mm.; tegmen, 3·6 mm.

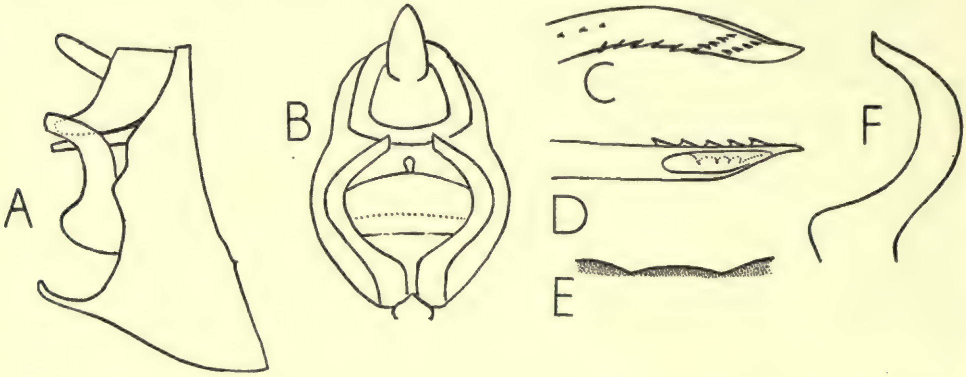

Fig. 6. *Phrictopyga nugax* sp. n.: A, male genitalia, right side; B, the same, posterior view; C, aedeagus, left side; D, the same, dorsal view; E, dorsal margin of middle part of diaphragm; F, genital style, lateral view.

Holotype male, Trinidad, T.W.I., St. Augustine, Apr. 1941, R. G. Fennah, on *Axonopus compressus*. This species is perhaps nearest to *P. fuscovittata* Muir but differs in having the anal segment unarmed and the medioventral process of the pygofer, the aedeagus and the genital styles differently shaped.

Genus ***EUIDELLA*** Puton

Puton, 1886, *Cat. Hémipt. Faune Paléarctique*: 72. Logotype, *Delphax basilinea* Germar, 1821, *Mag. Ent.* **4**: 105.

Euidella afasciata Caldwell

Caldwell & Martorell, 1950, *J. Agric. Univ. P.R.* **34**: 190.

One ♂, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah.

Genus ***CHLORIONA*** Fieber

Fieber, 1866, *Verh. zool. bot. Ges. Wien.* **16**: 522. Logotype, *Delphax unicolor* Herrich-Schaffer, 1835, *Nom. Ent.* **1**: 66.

Subgenus **SOGATELLA** Fennah

Fennah, 1956, *Ins. of Micronesia*, **6** (**3**) : 115. Orthotype of subgenus, *Delphax furcifera* Horvath, 1899, *Term. Fuzetek.* **22** : 372.

Chloriona (Sogatella) kolophon (Kirk.)

Delphax kolophon Kirkaldy, 1907, *Hawaii Sug. Pl. Ass. ent. Bull.* **3** : 157.

One ♂, Jamaica, T.W.I., Hope, Mona House, Nov. 1940, R. G. Fennah. One ♂, Montserrat, T.W.I., Jan. 1939, R. G. Fennah. One ♂, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah. Nine ♂, 2 ♀ Venezuela, Maracay, 4th, 6th June, 1951, H. E. Box.

Chloriona (Sogatella) wallacei (Muir) ***comb. n.***

Sogata wallacei Muir & Giffard, 1924, *Hawaii Sug. Pl. Ass. ent. Bull.* **15** : 13.

One ♂, Jamaica, T.W.I., Hope, Mona House, Nov. 1940, R. G. Fennah. One ♂, Dominica, T.W.I., Goodwill Estate, May 1941, R. G. Fennah.

Chloriona (Sogatella) cubana (Crawford) ***comb. n.***

Dicranotropis cubanus Crawford, 1914.

Eleven ♂, St. Lucia, T.W.I., Choiseul, 5th May, 1939; Union Experimental Station, Nov. 1939, R. G. Fennah. One ♂, Venezuela, Maracay, 450 m., 20th June, 1951, H. E. Box.

Chloriona (Sogatella) approximata (Crawford) ***comb. n.***

Megamelus approximatus Crawford, 1914, *Proc. U.S. nat. Mus.* **46** : 622.

One ♂, 1 ♀, Peru, Pativilca Valley, 10th Sept., 1949, H. E. Box, on sugarcane.

Chloriona (Sogatella) orizicola (Muir) ***comb. n.***

Sogata orizicola Muir, 1926, *Hawaii Sug. Pl. Ass. ent. Bull.* **18** : 27.

Two ♂, Venezuela, Maracay, 4th June, 1951, H. E. Box.

Chloriona (Sogatella) nautica (Muir) ***comb. n.***

Sogata nautica Muir, 1926, *Hawaii Sug. Pl. Ass. ent. Bull.* **18** : 26.

One ♂, Venezuela, Maracay, 4th May, 1951, H. E. Box.

Genus **DELPHACODES** Fieber

Fieber, 1866, *Verh. zool. bot. Ges. Wien*, **16** : 524. Logotype, *Delphax mulsanti* Fieber, 1866, loc. cit. : 526.

Delphacodes humilis (Van Duzee)

Liburnia humilis Van Duzee, 1907, *Bull. Buff. Soc. nat. Sci.* **8** : 48.

One ♂, Montserrat, T.W.I., Dec. 1938, R. G. Fennah.

Delphacodes albinotata (Crawford)

Megamelus teapae albinotatus Crawford, 1914, *Proc. U.S. nat. Mus.* **46** : 619.

One ♂, Dominica, T.W.I., June 1939, R. G. Fennah.

Delphacodes axonopi Fennah

Fennah, 1945, *Proc. U.S. nat. Mus.* **95** : 434.

One ♂, St. Lucia, T.W.I., Union Experimental Station, Nov. 1939, R. G. Fennah. One ♂, Venezuela, Maracay, 4th June, 1951, H. E. Box.

In the aedeagus of this species the orifice is quite definitely on the left side and is bounded on its basal margin with four or five teeth.

Delphacodes balboae Muir & Giffard

Muir & Giffard, 1924, *Hawaii Sug. Pl. Ass. ent. Bull.* **15** : 36.

One ♂, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah. One ♂, Venezuela, Maracay, 4th June, 1951, H. E. Box.

Delphacodes havanae Muir & Giffard

Muir & Giffard, 1924, *Hawaii Sug. Pl. Ass. ent. Bull.* **15** : 37.

One ♂, Jamaica, T.W.I., Hope, Mona House, Nov. 1940, R. G. Fennah ; 4 ♂, Trinidad, T.W.I., St. Augustine, Oct. 1952, R. G. Fennah, on *Axonopus compressus*. Five ♂, 2 ♀, Venezuela, Maracay, 450 m., 31st May, 4th, 20th June, 1951, H. E. Box.

Delphacodes havanensis (Crawford)

Megamelus albidens havanensis Crawford, 1914, *Proc. U.S. nat. Mus.* **46** : 622.

One ♂, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah.

Delphacodes propinqua Fieber

Delphax propinqua Fieber, 1866, *Verh. zool. bot. Ges. Wien*, **16** : 525.

Twenty-five ♂, 46 ♀, and 15 nymphs, Montserrat, T.W.I., Plymouth, Feb. 1940, R. G. Fennah. Two ♂, Dominica, T.W.I., Saltoun, June, 1939, R. G. Fennah. Six ♂, 8 ♀, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah. One ♂, 1 ♀, St. Vincent, T.W.I., Three Rivers, Sept. 1941, R. G. Fennah. One ♂, Grenada, T. W.I., Tempe Valley, Oct. 1943, R. G. Fennah. Five ♂, 4 ♀, Trinidad, T.W.I., St.

Augustine, 29th Nov., 1938, E. McC. Callan, on *Axonopus compressus*. Two ♂, Venezuela, Maracay, 450 m., 20th June, 1951, H. E. Box.

Delphacodes floridae Muir & Giffard

Muir & Giffard, 1924, *Hawaii Sug. Pl. Ass. ent. Bull.* **15** : 33.

D. floridae puertoricensis Caldwell

Caldwell & Martorell, 1950, *J. Agric. Univ. P.R.* **34** : 185.

One ♂, Montserrat, T.W.I., Plymouth, Jan. 1939, R. G. Fennah.

Delphacodes teapae (Fowler)

Liburnia teapae Fowler, 1905, *Biol. Cent.-Amer. Homopt.* **1** : 135.

Three ♂, Montserrat, T.W.I., Plymouth, Jan. 1939, R. G. Fennah. Eight ♂, 6 ♀, Dominica, T.W.I., Copt Hall, June 1939, R. G. Fennah. Thirteen ♂, 10 ♀, St. Lucia, T.W.I., Choiseul, 5th May, 1939, R. G. Fennah. Three ♂, St. Vincent, T.W.I., Mar. 1941, R. G. Fennah. Fifteen ♂, 12 ♀, and 6 nymphs, Trinidad, T.W.I., St. Augustine, 20th Dec., 1950, R. G. Fennah, on *Axonopus compressus*.

Delphacodes nigrifacies Muir

Muir, 1918, *Proc. Hawaii ent. Soc.* **3** : 428.

One ♂, 1 ♀, Montserrat, T.W.I., Plymouth, May 1941, R. G. Fennah. Twenty-five ♂, 31 ♀, Dominica, T.W.I., Greenhill, July 1939, R. G. Fennah. Ten ♂, 6 ♀, St. Lucia, T.W.I., Volet-Quilesse Road, Nov. 1939, R. G. Fennah. Seventy-one ♂, 43 ♀ and 52 nymphs, St. Vincent, T.W.I., Three Rivers, Sept., 1941, R. G. Fennah. One ♂, 2 ♀, Venezuela, Maracay, 450 m., 4th, 20th, June 1951, H. E. Box.

Delphacodes venilia sp. n.

(Text-fig. 7, A–C)

Head with eyes as broad as pronotum.

Vertex quadrate, as long as broad at base, apex a little narrower than base, transverse but angulately produced at middle, base distad of middle of eyes. Frons longer than broad (2 : 1) widest at middle, lateral margins arcuate. Antennae reaching nearly to middle of clypeus, second segment twice as long as first. Pronotum with lateral carinae concave, not reaching hind margin. Post-tibial spur with 13 teeth.

Stramineous ; frons and clypeus between carinae, basal segment of antennae, pleurites of thorax, abdominal tergites in part, genital styles and pygofer except dorsally, dilute yellowish-brown, posterior lateral margins of pygofer pallid or creamy. Tegmina (brachypterous) hyaline faintly tinged yellowish, apical margin pallid. Female coloured similar to male.

Anal segment of male very short, ring-like, apical angles each strongly produced ventrad in a stout curved spinose process, the processes well separated basally. Pygofer with laterodorsal angles strongly and broadly produced caudad, incurved at apex in a small blunt process; diaphragm very narrow at middle, heavily pigmented, dorsal margin slightly elevated at middle and median area slightly produced caudad, the armature polished. Aedeagus moderately long, slightly upcurved distad, orifice on left at apex, about five teeth round upper margin of orifice, descending slightly on left side, a row of teeth on each side ventrolaterally. Genital styles rather long, rather strongly produced caudad basally, where they meet in middle line, evenly shallowly concave on inner margin, outer margin angulately convex, apical margin sinuate, with inner angle narrowly produced, outer angle broadly acute.

Male (brachypterous): length, 2·0 mm.; female (brachypterous): length, 2·5 mm.

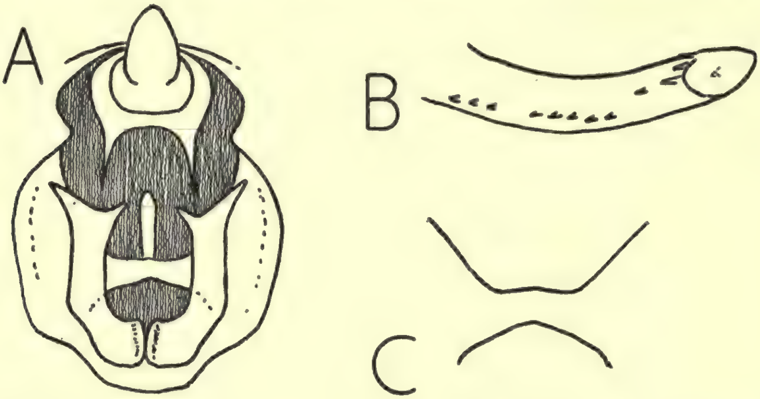

FIG. 7. *Delphacodes venilia* sp. n.: A, male genitalia, posterior view; B, aedeagus, left side; C, middle portion of diaphragm.

Holotype male and 20 ♂, and 13 ♀, Montserrat, T.W.I., near Plymouth, May 1940, R. G. Fennah. This species differs from *D. axonopi* Fenn. and *D. nigra* Cwfd. in the shape of the armature of the diaphragm, in the absence of a projection on the inner margin of the genital styles and in colour; from *D. propinqua* also it differs in the shape of the armature of the diaphragm and of the genital styles. It appears to be this species which Caldwell & Martorell have reported from Puerto Rico under the name *Delphacodes nigra* (1950: 183). It differs from *D. boxi* M. & G., from British Guiana, in the shape of the armature of the diaphragm and in coloration.

Delphacodes philyra sp. n.

(Text-fig. 8, A–C)

Head with eyes not as broad as pronotum. Vertex a little longer than broad (about 1·1 : 1), anterior margin transverse, slightly produced at middle, lateral margins weakly concave, apical margin as long as basal, basal margin distad of middle of eyes, frons longer than broad (2·4 : 1), as wide at apex as at base, lateral margins weakly arcuate, frons widest at middle; antennae reaching to base of clypeus, basal segment distinctly longer than broad, second segment about 1·6 times length of first; ocelli prominent, supra-ocellar organ distinct, rostrum reaching to post-coxae, penultimate segment longer than apical. Pronotum in middle line about three-quarters of length of vertex in middle line, lateral discal carinae concave, not reaching hind margin. Basal metatarsal segment longer than other two segments combined, spur moderately broad with 18 teeth on margin.

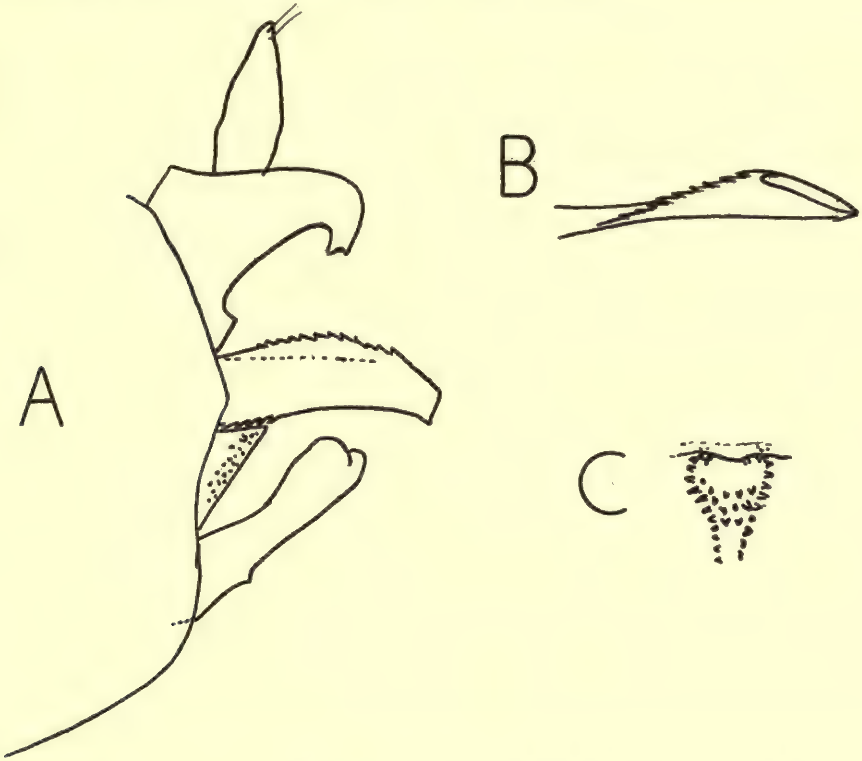

FIG. 8. *Delphacodes philyra* sp. n.: A, male genitalia, left side; B, aedeagus, dorsal view; C, armature of diaphragm.

Castaneous-fuscous; an ovate area on genae yellowish, antennae, rostrum and legs pallid stramineous. Tegmina fuscous, a hyaline area between node and apical angle. Wings hyaline, tinged fuscous with fuscous veins.

Anal segment of male short, broadly ring-like, lateroapically distinctly tumid, lateroapical angles each produced lateroventrad in a blunt lobe minutely and irregularly denticulate on its distal margin. Pygofer with posterior opening distinctly longer than broad, anal emargination small, laterodorsal angles not at all produced, lateral margins in side view very shallowly convex, almost straight, diaphragm with dorsal margin very shallowly concave, very weakly further excavate in median quarter of its width, armature in form of a quadrate boss projecting caudad, dorsally transverse, ventrally produced ventrad as a median ridge, heavily pigmented throughout. Aedeagus rather short, strongly laterally compressed, almost foliate, ventral margin in profile concave, dorsal margin convex, five teeth on ventral margin near base, 14 fine teeth dorsally extending from right dorsal margin at apex to left dorsal margin one-quarter from base, a minute tooth or irregularity on edge of orifice ; orifice terminal. Genital styles in posterior view rather broad and short, inner and outer margins concave, apical margin sinuate, outer angle broadly produced, inner angle narrowly produced, rounded at tip.

Male (macropterous) : length, 2·6 mm.; tegmen, 3·0 mm. Female (macropterous) : length, 2·8 mm.; tegmen, 3·3 mm.

Holotype male and 36 ♂ and 24 ♀, St. Lucia, T.W.I., Morne Fortunée, Feb. 1940, R. G. Fennah. This species closely resembles *D. teapae* Fowl. and *D. nitens* M. & G., but can be separated easily from both. From *D. teapae* it differs in the vertex being longer than broad, and its posterior compartments being infuscate, not paler than the anterior part. The side of the head above the eyes is wide enough to accommodate an ocellus in *philyra*, but definitely too narrow to do so in *D. teapae*. The post-tibial spur of *D. philyra* has 18 teeth, that of *D. teapae* 13. In the genitalia the laterodorsal areas of the anal segment are distinctly tumid in *D. philyra*, and the processes are subtriangular and moderately long ; in *D. teapae* the laterodorsal areas are not at all tumid and the processes are short. The aedeagus has a different arrangement of spines, and the armature of the diaphragm is quadrate dorsally and linear ventrally in *D. philyra*, but of equal width throughout in *D. teapae*. From *D. nitens* it differs in its generally paler hue, in the shape of the processes of the anal segment, and of the armature of the diaphragm, in the spinose ornamentation of the aedeagus and in the shape of the genital styles. Caldwell & Martorell (1950, pl. 21, d7) figure an anal segment as a variant of *D. teapae*, and record that some specimens had the vertex wholly brown, and that some approached *D. nitens*. It seems probable that the present species was represented in this material. If this were so, it would suggest that this species belongs with the Greater Antillean and perhaps Central American fauna, since the writer has taken long series of *D. teapae* in Trinidad but has not found a single specimen of *D. philyra*.

Delphacodes iaxartes sp. n.

(Text-fig. 9, A–C)

Head with eyes not quite as wide as pronotum. Vertex quadrate, broader than long, anterior margin sinuate, a little produced at middle, posterior margin slightly distad of middle of eyes. Frons twice as long as broad, widest at level of lower margin of eyes, lateral margins diverging from base to level of lower margin of eyes, thence almost straight, very feebly converging distad, apical margin of frons as wide as basal margin ; median carina forked at base. Antennae not reaching beyond base of clypeus, basal segment as long as broad, second about twice as long as first. Pronotum with lateral carinae concave, not attaining posterior margin. Post-tibial spur with 18 teeth.

Stramineous ; carinae of frons faintly bordered with yellowish brown. Tegmina hyaline, tinged yellow, veins concolorous.

Anal segment of male very short, ring-like, a pair of short spinose processes, set well apart, arising from apical margin and lying reflexed cephaloventrad close against lower side of anal segment. Pygofer moderately long, dorsolateral angles strongly produced caudad and incurved mesad distally, lateral margins oblique, shallowly concave, a slight angular convexity on each side separating lateral margins from ventral margin, which is concave ; diaphragm broad laterally, narrow medially, V-shaped, a stout vertical pigmented and sclerotized ridge developed submedially on each side and produced dorsad from near upper margin as a peg-like process, each lying directly behind the corresponding genital style, median part of diaphragm not at all pigmented or sclerotized. Genital styles long, rather strongly quadrately produced caudad where they meet in middle line near base, thence rather narrow, tapering to obliquely-truncate apex in posterior view, 'inner margin shallowly sinuately concave, outer margin angulately convex near base, then shallowly concave to apex, outer apical angle obtuse, inner apical angle acute.

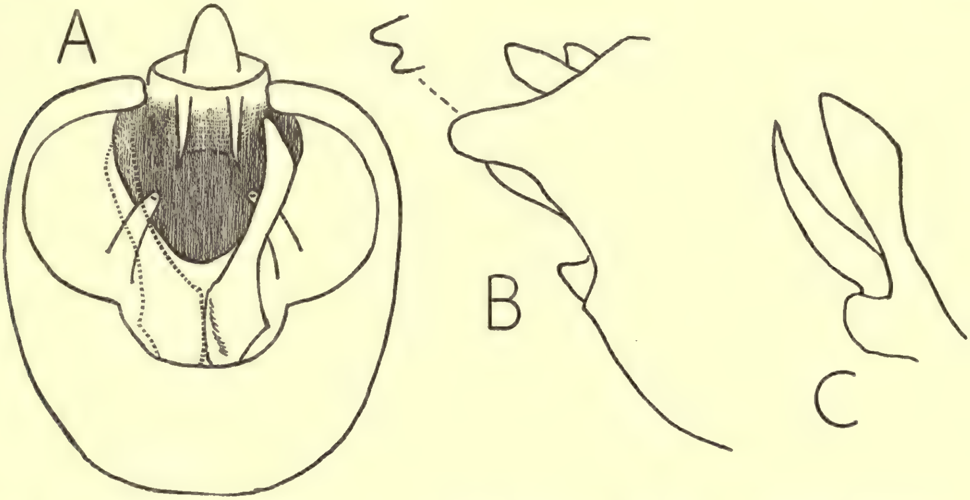

FIG. 9. *Delphacodes iaxartes* sp. n.: A, male genitalia (without aedeagus), posterior view ; B, the same, right side, with incurved apex of dorsolateral angle shown separately ; C, genital styles, posteroventral view from right, showing caudal projection at base of style.

Male (brachypterous) : length, 2·6 mm.

Holotype male, St. Lucia, T.W.I., Union Experiment Station, Nov. 1939, R. G. Fennah. The aedeagus of this specimen is unfortunately missing, but the other elements of the male genitalia are quite unlike those of any species known to the writer, and the ornamentation of the diaphragm appears to be unique.

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THE ACROMETOPAE OF THE ETHIOPIAN REGION: A REVISION, WITH NOTES ON THE SEXUAL DIMORPHISM SHOWN BY THE GROUP (ORTHOPTERA: TETTIGONIIDAE)

D. R. RAGGE

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SYNOPSIS

The African genera of the Phaneropterine group Acrometopae are fully revised. The names for these genera are reduced in number by new synonymy from fourteen to three, and in addition two new genera are described. Keys are given to the genera and species. It is shown that the two sexes of several of the species have hitherto been placed in different genera and in many cases in different species. Fourteen specific names have been newly synonymized and nine new species are described.

INTRODUCTION

THIS revision covers all the species of Phaneropterinae which have been described or included in *Horatosphaga* Schaum, *Conchotopoda* Karsch, *Peronura* Karsch, *Plegmatoptera* Karsch, *Pantolepta* Karsch, *Rhegmatopoda* Brunner, *Pachypyga* Karsch, *Euthyphlebia* Schulthess, *Thaumatoxenia* Kirby, *Keniacola* Sjöstedt, *Schulthessinia* Sjöstedt, *Pachypygiana* Strand, *Eupantolepta* Bolivar, and *Plegmatia* Uvarov. Of these generic names, all but the first three are newly synomymized : *Rhegmatopoda* Brunner with *Conchotopoda* Karsch, and the remaining ten with *Horatosphaga* Schaum.

The group-name Acrometopae is used here in the sense in which it was used by Brunner (1891, p. 5). It is not pretended that it is a satisfactory taxonomic unit, but it has nevertheless a use of convenience for a group of Phaneropterinae which probably had a monophyletic origin. This group may be characterized by the lack of a fore coxal spine, biconchate fore tibiae, sloping fastigium of the vertex, reduced or vestigial hind wings in the female, and at least some stridulatory modification of the male fore wings *outside* the stridulatory organ itself (i.e. modifications anterior or distal to the cubital and anal areas). In the case of the European genus *Acrometopa* Fieber the basal part of the radial area of the male fore wings is somewhat modified in connection with stridulation, but in the remaining Acrometopae, which are all African, it is the basal regions of areas MA and Cu_{1a} which are primarily involved (though in *Horatosphaga* Schaum the entire male fore wings typically show a modified, web-like venation). In *Peronura* Karsch the male fore wings are too reduced to show this specialization clearly, but some basal modification of area MA is still apparent. *Lamecosoma* gen. n. is not a very close relative of the other genera of Acrometopae, but has clear affinities with the group and is included here for convenience.

Perhaps the chief feature of interest of the group is the high degree of sexual dimorphism shown by many of the species. It is in the genus *Horatosphaga* Schaum that the difference between the sexes reaches its greatest expression. The intersexual differences in this genus are often of the same order as differences between genera in other Phaneropterinae. The shape of the head, pronotum, and hind femora, is in several species quite different in the two sexes, and the venation of the male fore wings often bears no resemblance to that of the female.

It is because of these great differences (enhanced by geographical variation) that the forty-three specific names hitherto known in the African Acrometopae were divided amongst fourteen generic names, eleven of which are here newly synonymized. In two of the most common and widespread species of *Horatosphaga* Schaum (*H. serrifera* Schaum and *H. leggei* (Kirby)) the two sexes have been placed in different genera, and this is also true of the less widespread species *H. somali* (Schulthess). A brief history of the chaotic state of affairs which has resulted from this type of confusion is given below.

The genus *Horatosphaga* was erected by Schaum in 1853 for a female specimen, which he named *H. serrifera.* No further species of the group was described until 1887, when Karsch erected the genus *Conchotopoda* for a new species *C. belcki* Karsch. In the following year Karsch erected the genus *Peronura* for two new species *P. clavigera* Karsch (subsequently selected as type species by Kirby, 1906) and *P. hildebrandtiana* Karsch (see p. 320).

During the next thirty-five years nine further generic names were proposed for African Acrometopae, but only the three genera mentioned above are given separate status in this revision. In 1888 Karsch erected the two further genera *Plegmatoptera* and *Pantolepta*. *Plegmatoptera* Karsch was based on *P. reticulata* Karsch, known only by the unique female holotype. This species clearly belongs to *Horatosphaga* Schaum and the holotype is quite possibly a female of one of the species of this genus which are known only by males (e.g. *H. regularis* (Bolivar), see p. 307); the exact identity of this species will remain obscure until undoubted males are available. *Pantolepta* Karsch was based on *P. heteromorpha* Karsch, which is undoubtedly congeneric with *H. serrifera* Schaum.

Rhegmatopoda was erected by Brunner in 1891 for *Horatosphaga leptocerca* Stal, 1876. For reasons stated on p. 326, however, it has become clear that *Rhegmatopoda* Brunner is a synonym of *Conchotopoda* Karsch.

In 1893 Karsch erected the genus *Pachypyga* for a new species *P. inclusa* Karsch. The claims for separate status of this genus rest solely on the male genitalia. However, the enlarged male tenth abdominal tergite and subgenital plate of *P. inclusa* Karsch merely represent an intermediate stage between the relatively simple type of male genitalia found in *H. serrifera* Schaum, for example, and the highly modified tenth abdominal tergite and subgenital plate of the males of such species as *H. ruspolii* (Schulthess) and *H. diminuta* (Chopard). The male cerci are of exactly the same type in all these species and the females differ by no character of taxonomic importance at the generic level. The wing-venation of all these species shows clearly their close affinities with each other, and in my opinion it would be most inadvisable to segregate these different stages of male genitalic development into different genera. This progressive enlargement of the tenth abdominal tergite and subgenital plate of the males is closely similar to the trend shown by *Phaneroptera* Serville, in which every intermediate stage is shown and in which again the females show no parallel development of taxonomic significance (see Ragge, 1956, p. 213). Enlargements of various parts of the male genitalia are not uncommon in the Phaneropterinae and, though providing excellent specific characters, do not form a suitable basis for segregating species into genera.

In 1898 Schulthess erected the genus *Euthyphlebia* for a new species *E. parallela* Schulthess. This specific name is, however, a synonym of *Horatosphaga heteromorpha* (Karsch) (see p. 298), the type species of *Pantolepta* Karsch, and the name *Euthyphlebia* Schulthess must therefore be rejected. The genus *Thaumatoxenia* was erected by Kirby in 1909 for *Th. leggei* Kirby ; this species clearly belongs to *Horatosphaga* Schaum, being closely related to its type species *H. serrifera* Schaum. *Keniacola* Sjöstedt, 1912, was based on *K. gracilis* Sjöstedt, which is also without doubt congeneric with *Horatosphaga serrifera* Schaum. In the same paper in which *Keniacola* Sjöstedt was erected, Sjöstedt proposed the new genus *Schulthessinia* for *Conchotopoda ruspolii* Schulthess. Sjöstedt's grounds for regarding this species as being generically distinct were solely the much modified male genitalia, and it was this character alone which was described in the original description of the genus. This genitalic development takes the extreme form mentioned in the last paragraph above, and to which the male genitalia of *Horatosphaga inclusa* (Karsch) and *H. crosskeyi* sp. n. (p. 318) form an intermediate stage ; for the reasons stated in the same paragraph this character cannot be regarded as being of generic value, and *Schulthessinia* Sjöstedt is therefore synonymized in the present work.

The genus *Eupantolepta* was erected by Bolivar in 1922 for a new species *E. regularis* Bolivar. As will be shown on p. 307 the exact status of this species is still in some doubt, but it is quite certain that it represents a normal and unmodified member of the genus *Horatosphaga* Schaum.

Finally, two new names have been proposed for genera of African Acrometopae whose original names were preoccupied. Unfortunately both these original names are synonymized here with *Horatosphaga* Schaum, so that the new names must also be added to the synonymy of this genus. The first is *Pachypygiana* Strand, 1921, which was to replace *Pachypyga* Karsch, 1893 (preoccupied by *Pachypyga* Steinheil, 1873, Coleoptera), and the second is *Plegmatia* Uvarov, 1940, which was proposed in place of *Plegmatoptera* Karsch, 1888 (preoccupied by *Plegmatoptera* Spinola, 1839, Hemiptera).

It is a remarkable fact that all the generic synonyms discussed above were based on relatively unspecialized species of *Horatosphaga* Schaum, which few modern workers would deny are congeneric. Even in the species where the male genitalia have become greatly modified, the facies is identical to the species with more generalized genitalia. For example, if one takes males of the three species *Horatosphaga elongata* (Rehn) (normal genitalia), *H. crosskeyi* sp. n. (modified genitalia), and *H. ruspolii* (Schulthess) (highly modified genitalia), they might almost be taken to be the same species if the genitalia were ignored : the wing-venation (usually the best specific character), pronotum, femoral armature, coloration, and dimensions, are all very similar. There are, however, a number of aberrant species which fit much less readily into *Horatosphaga* Schaum, though having closer affinities with this genus than with any other genus of Acrometopae. These species are *H. nuda* sp. n., *H. meruensis* (Sjöstedt), *H. nomima* (Karsch), *H. montivaga* (Sjöstedt), and *H. elgonis* (Chopard). The second of these species was described in *Plegmatoptera* Karsch and the last three in *Peronura* Karsch. In the males of all these species the fore wings are somewhat reduced and the hind wings are rudimentary. The characteristic web-like venation shown by the male fore wings of *Horatosphaga* Schaum has been almost or entirely lost and the general appearance (partly as a result) has diverged from the usual generic facies. All these species, however, show indisputable evidence in the male wing-venation of their derivation from stock more typical of *Horatosphaga* Schaum : they all show, either clearly or in a reduced state, the basal modifications of areas MA and Cu_{1a} which are characteristic of that genus, whilst not showing the fold at the base of the medial vein which characterizes *Conchotopoda* Karsch.

In the case of *H. nuda* sp. n. and *H. meruensis* (Sjöstedt) the basal region of the male fore wings is quite normal for *Horatosphaga* Schaum, only the more distal part having become reduced. In *H. nomima* (Karsch) and *H. montivaga* (Sjöstedt) (which are closely interrelated) the reduction of the fore wings is more advanced and the basal vein-pattern has begun to be obscured. In *H. elgonis* (Chopard) the reduction also affects the whole of the fore wings, but the male genitalia are considerably modified and this species has evidently arisen quite independently from *H. nomima* (Karsch) and *H. montivaga* (Sjöstedt). If, therefore, these forms with reduced fore wings were given separate generic status, it would be necessary to put them in three different genera, all of which would have to be given new names. These genera would be almost impossible to define, both in relation to each other and in relation to the restricted concept of *Horatosphaga* Schaum. It is, moreover, quite possible that further species will be discovered showing various other stages of wing-reduction, in which case the small gaps which might now provide grounds for generic separations would quite probably be bridged. In this revision the five species under discussion have, therefore, all been included in *Horatosphaga* Schaum. The genus, as it then stands, admittedly contains a rather heterogeneous assemblage of species, at least as far as the males are concerned, but it is the author's view that this is at present unavoidable.

The segregation of the remaining African Acrometopae is also a matter of some difficulty. The species *calaharica* Karny and *splendens* sp. n. seem to represent relics of a form ancestral to both *Conchotopoda* Karsch and *Horatosphaga* Schaum, and I have erected for them the genus *Prosphaga* gen. n. This genus is clearly more primitive than any of the other African Acrometopae, the male fore wings showing neither the fold at the base of M which is diagnostic of *Conchotopoda* Karsch, nor the web-like pattern of cross-veins which characterizes *Horatosphaga* Schaum, and the general facies of this sex not having developed the extremely attenuate form of *Lamecosoma* gen. n. That *Prosphaga* gen. n. is not an offshoot from *Horatosphaga* Schaum which has partially lost the wing-specializations of the latter genus is shown by the fact that in the female fore wings of *P. calaharica* (Karny) the base of MP is well developed, as is usual in the Tettigoniidae ; in *Horatosphaga* Schaum the basal part of MP (before its fusion with Cu_{1a}) is either lost or represented by an oblique cross-vein.

I have erected the genus *Lamecosoma* gen. n. for a remarkable new species *tenuis* sp. n. As mentioned earlier this species shows clear affinities with the other African Acrometopae, but the relationship has been obscured by the extreme attenuation of the body and limbs.

Kirby (1906) listed nine genera of African Acrometopae, containing a total of nineteen species. In the present work five genera are recognized, containing a total of thirty-three definite species and two whose status remains uncertain. Two genera and nine species are new. There are eleven generic synonyms and fourteen definite specific synonyms ; all these are newly established. Four further specific names are probably synonyms but cannot at present be definitely established as such. The total number of specific names involved in the African Acrometopae is now fifty-three.

Access was gained to all the existing type specimens except for four in the Museo Civico di Storia Naturale, Genoa ; photographs, drawings, and descriptions of these four types were sent through the great kindness of Dr. F. Capra. The holotype of *Conchotopoda belcki* Karsch is lost.

ACKNOWLEDGMENTS

I must extend my most sincere thanks to the following specialists who have spared time and energy to send me type specimens and other material from their respective museums :

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My sincere gratitude is also due to the following workers, who have most kindly sent me specimens which they have collected personally :

Mr. and Mrs. R. W. Crosskey, Mr. A. E. King, and Mr. J. A. Whellan.

Finally I wish to thank Miss P. M. Stock for her practical assistance.

MATERIAL

In addition to the collection of African Acrometopae in the British Museum (Natural History) material was lent by the sources listed below, through the courtesy of the specialists acknowledged above.

Musée du Congo Belge, Tervuren ; Naturhistorisches Museum, Vienna ; Muséum National d'Histoire Naturelle, Paris ; South African Museum, Cape Town ; Universitetets Zoologiska Institution, Lund ; Naturhistoriska Riksmuseum, Stockholm ; University Museum, Oxford ; Academy of Natural Sciences, Philadelphia ; Zoologisches Museum of the Humboldt-Universität, Berlin.

TREATMENT

The general treatment adopted is the same as in my revision of *Phaneroptera* Serville (Ragge, 1956) and most of the remarks given on pp. 208 and 209 of that paper apply here. The wing-vein nomenclature used (see Text-fig. 2) is that of Ragge (1955). Statements about the relative lengths of the fore and hind wings assume that these organs are flexed. In all cases except *Peronura clavigera* Karsch the expression " total length " refers to the distance from the most anterior part of the head to the tips of the flexed wings (whichever pair extends furthest backwards) ; in *P. clavigera* Karsch, which is very brachypterous, this measurement has to take the tip of the subgenital plate as its posterior termination, and is therefore of limited value.

SEXUAL DIMORPHISM

The confusion in which the African Acrometopae have always been has resulted mainly from the high degree of sexual dimorphism shown by the group. In the more typical species of *Horatosphaga* Schaum the differences between the sexes are of the order of generic differences in other Phaneropterinae. It has thus been most difficult to associate the males with the females in any one species, and in some species this still remains to be done.

In the more common species series of both sexes were available which had been collected at the same time and place : in these cases the association of the two sexes was comparatively simple. In other cases, in which the species have been poorly collected and, especially, in which the females have become markedly brachypterous, the correlation of males with females was extremely difficult and is still in some doubt.

This is particularly true of the two species *H. somali* (Schulthess) and *H. ruspolii* (Schulthess), in both of which the males are fully winged and the females are apparently very brachypterous. The head, pronotum, and legs, also show quite large differences, and in fact the two sexes seem to have lost any resemblance to each other. In neither of these species have series of specimens containing both sexes and bearing identical data been available. The females have been associated with the males tentatively, on the grounds of being collected in the same locality and showing certain resemblances in coloration.

Some of the more usual differences between the sexes in *Horatosphaga* Schaum may be seen in Text-fig. 1. It will be noticed that the head of the female is "stretched" downwards in comparison with the male, and the vertex, in consequence, is more prolonged and slopes more steeply to the frons. The pronotum is not so distinctly selliform as in the male and does not have the inflated region (" humeral sinus ") in the posterior region of each lateral lobe. The female has more robust legs than the male, this being particularly noticeable in the case of the hind femur. The tympanic auricles of the fore tibiae are also not inflated in the way that the male ones are. The fore wings of the female are coarse in texture and have not undergone the very characteristic, rather web-like modification in venation shown by the male fore wings. As in all the Acrometopae the female has no hind wings, whereas in the male of the species illustrated, *H. media* sp. n., and of many other Acrometopae, the hind wings are fully developed. Although the general body-size of the female is greater than that of the male in the Acrometopae, both the hind femora and fore wings are almost always smaller than their male counterparts.

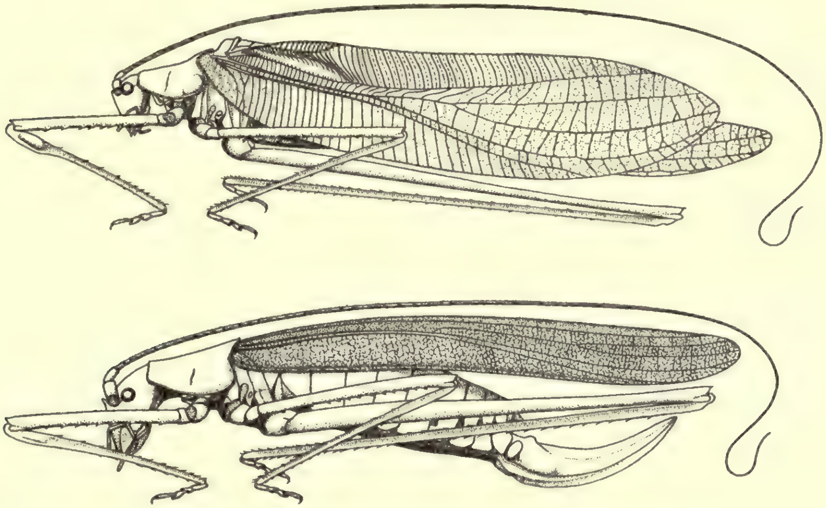


FIG. 1. *Horatosphaga media* sp. n., male (above) and female.

As can be seen from the foregoing remarks the differences between the sexes are considerable, and in other groups of Phaneropterinae would suggest that different genera were involved. Many of the genera of Acrometopae which have been hitherto recognized were known by only one of the sexes ; the other sex was often presumed to be similar. It is because of this that Chopard (1954), in the most recent key to the African genera of Phaneropterinae, characterizes six genera of Acrometopae as having the hind wings " bien developpées dans les deux sexes ", whereas in fact the females of all these genera are now known to have no hind wings.

In spite of the great intersexual differences the females of some species show a tendency to follow the same evolutionary trends as the males. For example, in

H. heteromorpha (Karsch) both sexes are rather attenuate, and indeed this is the only species of Acrometopae in which the female fore wings are longer than those of the male. Where the males have reduced fore wings their hind wings are either much abbreviated or absent, and the resemblance between the sexes is much closer. In species such as *H. meruensis* (Sjöstedt), *H. montivaga* (Sjöstedt), and *H. elgonis* (Chopard), in which the fore wings are reduced and various other modifications have taken place, the females resemble the males quite closely and the correspondence between the sexes is unmistakable. The reduction of the wings in the male sex is often accompanied by a change in shape of the head, pronotum, and legs, towards the female type. Thus the pronotum tends to lose its selliform shape, the vertex slopes more steeply, the hind femora become more robust, and the inflation of the tympanic auricles is less pronounced. It is probable that the selliform pronotum and less robust legs are associated with the ability to fly and that the difference in the degree of inflation of the tympanic auricles is due to the fact that only the males stridulate.

Key to the Genera

Females are unknown in *Lamecosoma* gen. n., and in *Conchotopoda* Karsch and *Prosphaga* gen. n. this sex is in each case known by only one specimen of one species. It is therefore impossible at present to include the female sex in the key to genera, especially as the females are so lacking in characters of taxonomic significance. It should be noted, however, that females with fore wings barely longer than the pronotum, or even shorter, belong to *Peronura* Karsch, and that the females of *Lamecosoma* gen. n. probably have fore wings more than seven times longer than their maximum width. Any female specimen of Acrometopae not belonging to these two genera and coming from between latitudes 5° N. and 20° S. is almost certainly a member of the genus *Horatosphaga* Schaum ; this also applies to any West African female.

Males

1. Fore wings less than twice the length of the pronotum . . . . . . *Peronura* Karsch (p. 320)
–. Fore wings more than twice the length of the pronotum. 2
2. Body very attenuate, as in Text-fig. 3, the fore wings more than seven times longer than their maximum width . . . . . . *Lamecosoma* gen. n. (p. 331)
–. Body less attenuate, not as in Text-fig. 3, the fore wings less than seven times longer than their maximum width 3
3. Basal region of M in the right fore wing developed into a heavily sclerotized posterior fold, forming a pocket next to the stridulatory organ, as in Text-fig. 4, and appearing as an opaque patch when the fore wing is extended, as in Text-figs. 5–10. . . *Conchotopoda* Karsch (p. 325)
–. Basal region of M in the right fore wing not modified as above, and not appearing as an opaque patch when the fore wing is extended 4
4. R_s of the fore wings (or its branches) ending at, or slightly in front of, the tip of the wing, as in Text-figs. 11–40. Cross-veins of area MA arranged in a regular, closely parallel fashion, or, if arranged irregularly, hind wings absent . . . . . *Horatosphaga* Schaum (p. 278)
–. R_s of the fore wings (or its branches) ending slightly behind, not actually at, the tip of the wing, as in Text-figs. 41 and 42. Cross-veins of area MA not arranged in a regular, closely parallel fashion. Hind wings fully developed . . . . *Prosphaga* gen. n. (p. 322)

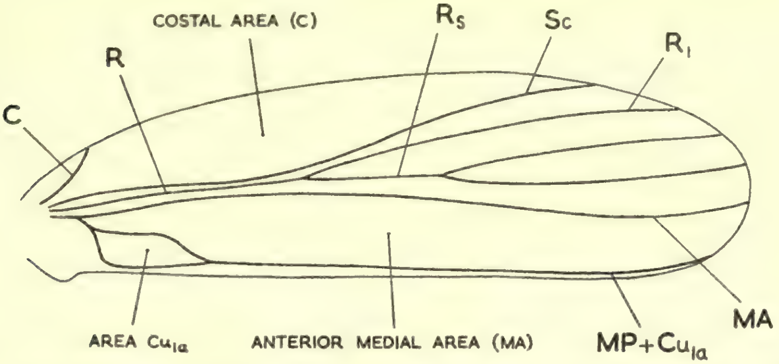

COSTAL AREA (C)
R
C
R_S
Sc
R_1
AREA Cu_{1a}
ANTERIOR MEDIAL AREA (MA)
$MP+Cu_{1a}$
MA

FIG. 2. Diagram showing the arrangement of the principal veins and areas in the male fore wing of a typical member of the African Acrometopae.

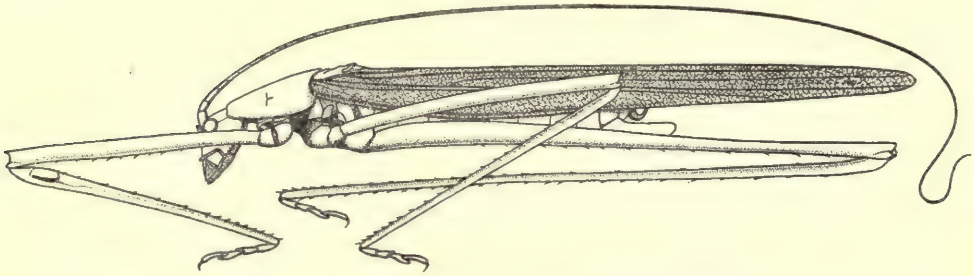


FIG. 3. *Lamecosoma tenuis* gen. et sp. n., male.

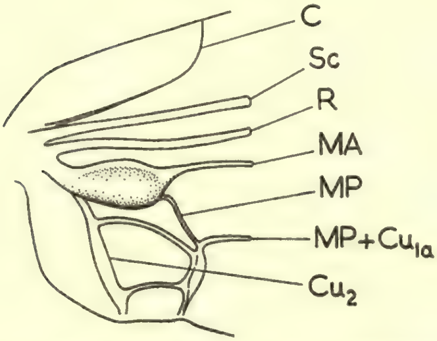

C
Sc
R
MA
MP
$MP+Cu_{1a}$
Cu_2

FIG. 4. The basal part of the right male fore wing of *Conchotopoda belcki* Karsch.

HORATOSPHAGA Schaum, 1853

Horatosphaga Schaum, 1853, *Ber. Preuss. Akad. Wiss. Berlin*, **1853** : 777. Type species, by monotypy, *Horatosphaga serrifera* Schaum, 1853.

Plegmatoptera Karsch, 1888, *Berl. ent. Z.* **32** : 429. Type species, by monotypy, *Plegmatoptera reticulata* Karsch, 1888. ***Syn. n.***

Pantolepta Karsch, 1888, *Berl. ent. Z.* **32** : 429. Type species, by monotypy, *Pantolepta heteromorpha* Karsch, 1888. ***Syn. n.***

Pachypyga Karsch, 1893, *Berl. ent. Z.* **38** : 124. Type species, by monotypy, *Pachypyga inclusa* Karsch, 1893. ***Syn. n.***

Euthyphlebia Schulthess, 1898, *Ann. Mus. Stor. nat. Genova*, **39** : 204. Type species by monotypy, *Euthyphlebia parallela* Schulthess, 1898. ***Syn. n.***

Thaumatoxenia Kirby, 1909, *Trans. zool. Soc. Lond.* **19** : 65. Type species, by monotypy, *Thaumatoxenia leggei* Kirby, 1909. ***Syn. n.***

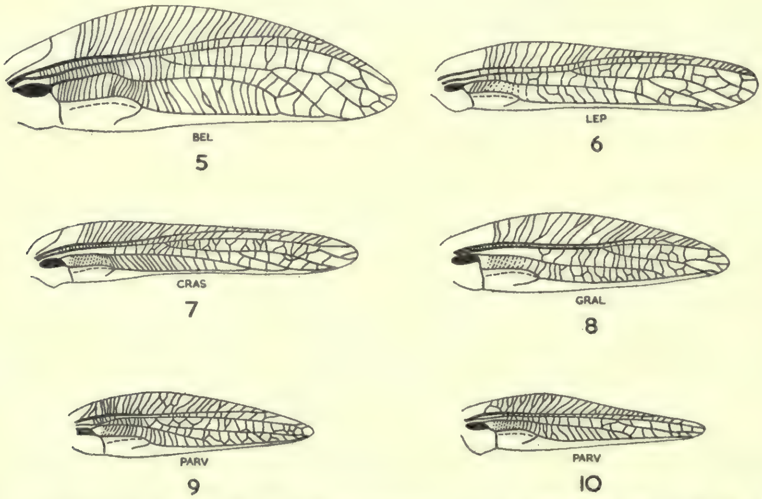
Keniacola Sjöstedt, 1912, *Ark. Zool.* **7** (38) : 13. Type species, by monotypy, *Keniacola gracilis* Sjöstedt, 1912. ***Syn. n.***

Schulthessinia Sjöstedt, 1912, *Ark. Zool.* **7** (38) : 15. Type species, by original designation, *Conchotopoda ruspolii* Schulthess, 1898. ***Syn. n.***

Pachypygiana Strand, 1921, *Ent. Z.* **34** : 106. Nom. n. for *Pachypyga* Karsch, 1893 (nec Steinheil, 1873). ***Syn. n.***

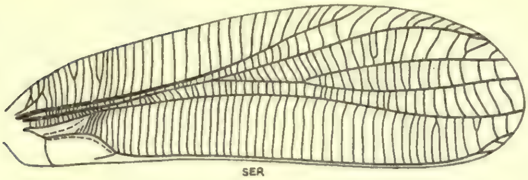
Eupantolepta Bolivar, 1922, *Voy. M. Rothschild E. Afr. Anim. Art.* **1** : 200. Type species, by monotypy, *Eupantolepta regularis* Bolivar, 1922. ***Syn. n.***

Plegmatia Uvarov, 1940, *Ann. Mag. nat. Hist.* (11) **6** : 116. Nom. n. for *Plegmatoptera* Karsch, 1888 (nec Spinola, 1839). ***Syn. n.***



FIGS. 5–10. The right male fore wing of (5) *Conchotopoda belcki* Karsch ; (6) *C. leptocerca* (Stal) ; (7) *C. crassicauda* sp. n. ; (8) *C. grallatoria* (Stal) ; (9) *C. parva* sp. n. (Orange Free State) ; (10) *C. parva* sp. n. (Pretoria).

DIAGNOSIS. ♂. Basal part of area MA of fore wings developed into longitudinal concavity with reduced venation, as in Text-fig. 43 ; area Cu_{1a} basally



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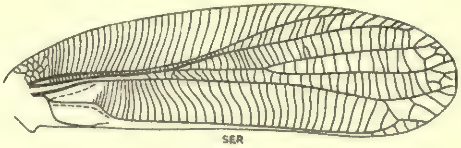

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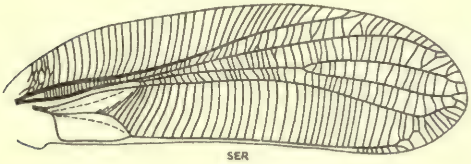

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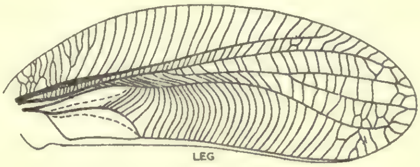

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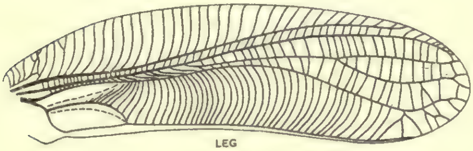

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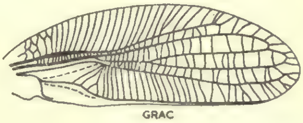

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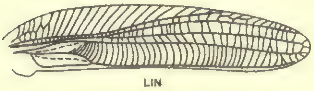

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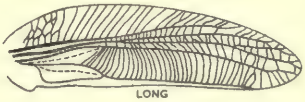

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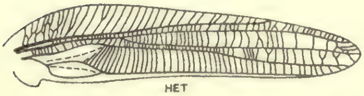

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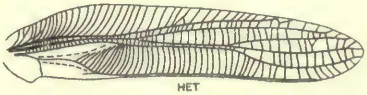

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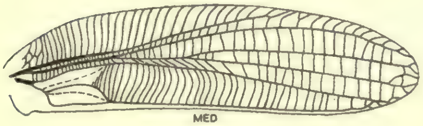

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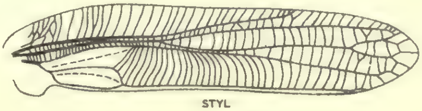

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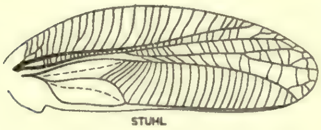

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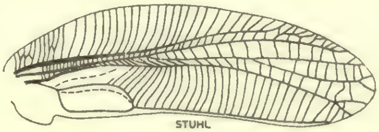

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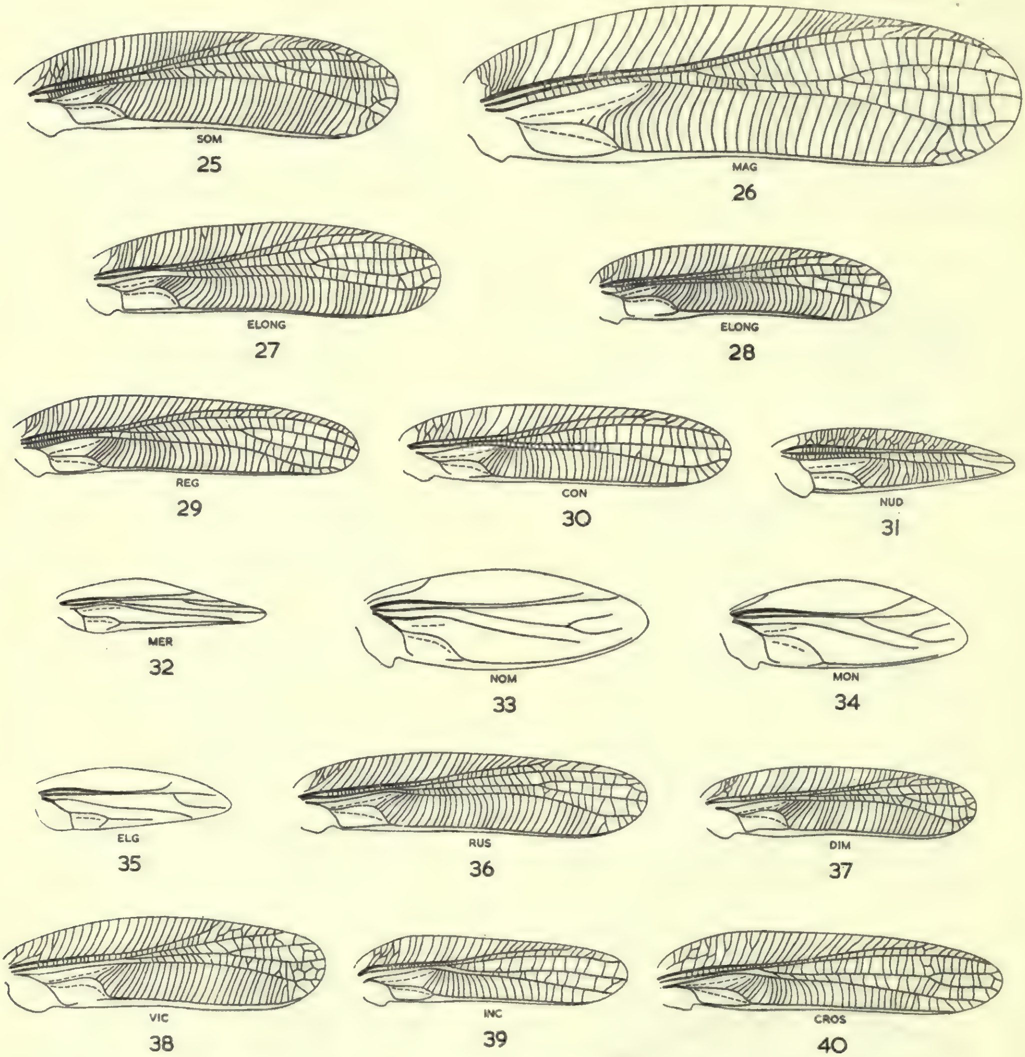
FIGS. 11–24. The right male fore wing of (11) *Horatosphaga serrifera* Schaum (Nyasaland); (12) *H. serrifera* Schaum (Northern Rhodesia); (13) *H. serrifera* Schaum (Angola); (14) *H. leggei* (Kirby) (Belgian Congo); (15) *H. leggei* (Kirby) (Tanganyika); (16) *H. gracilis* (Sjöstedt); (17) *H. linearis* (Rehn); (18) *H. longipes* (Bolivar); (19) *H. heteromorpha* (Karsch) (Northern Kenya); (20) *H. heteromorpha* (Karsch) (Mombasa); (21) *H. media* sp. n.; (22) *H. stylifera* (Karny); (23) *H. stuhlmanni* (Karsch) (Rutshuru); (24) *H. stuhlmanni* (Karsch) (Mahagi Port).

enlarged, as in Text-fig. 43. Cross-veins of fore wings (especially in costal and anterior medial areas) arranged in closely parallel fashion, forming web-like pattern, except in few brachypterous species. R_s of fore wings (or its branches) ending at tip of wing. Fastigium of frons reaching almost to top of antennal scrobes. Tympanic auricles of fore tibiae often inflated.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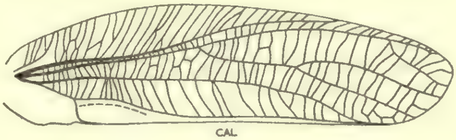
FIGS. 25–40. The right male fore wing of (25) *Horatosphaga somali* (*Schulthess*) ; (26) *H. magna* sp. n. ; (27) *H. elongata* (Rehn) (Usumbura) ; (28) *H. elongata* (Rehn) (Kahondo) ; (29) *H. regularis* (Bolivar) ; (30) *H. concava* sp. n. ; (31) *H. nuda* sp. n. ; (32) *H. meruensis* (Sjöstedt) ; (33) *H. nomima* (Karsch) ; (34) *H. montivaga* (Sjöstedt) ; (35) *H. elgonis* (Chopard) ; (36) *H. ruspolii* (Schulthess) ; (37) *H. diminuta* (Chopard) ; (38) *H. vicina* (Chopard) ; (39) *H. inclusa* (Karsch) ; (40) *H. crosskeyi* sp. n.

♀. No known diagnostic character.

Description. ♂. Fastigium of frons reaching almost to top of antennal scrobes. Fastigium of vertex compressed, sloping to frons, sulcate above.



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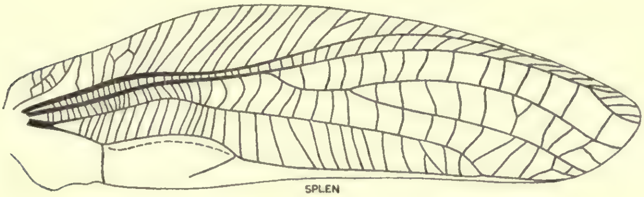

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Figs. 41 and 42. The right male fore wing of (41) *Prosphaga calaharica* (Karny) ; (42) *P. splendens* sp. n.

Pronotum without lateral carinae. Fore coxae without spine. Tympanic auricles of fore tibiae often inflated. Cross-veins of fore wings (expecially in costal and anterior medial areas) arranged in closely parallel fashion, forming web-like pattern, except in few brachypterous species. Basal part of area MA of fore wings developed into longitudinal concavity with reduced venation, as in Text-fig. 43 ; area Cu_{1a} basally enlarged, as in Text-fig. 43. R_s of fore wings (or its branches) ending at tip of wing.

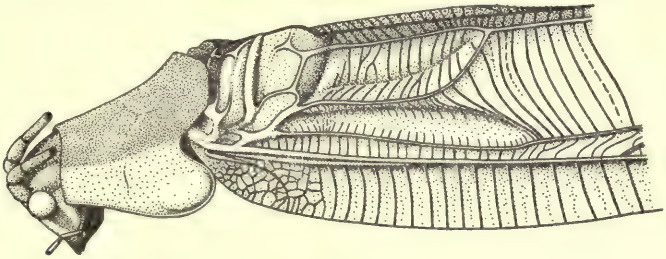


Fig. 43. Dorso-lateral view of the head, pronotum and basal part of the fore wings of *Horatosphaga media* sp. n.

♀. As male except for following characters. Fastigium of vertex sloping steeply to frons. Pronotum sometimes with lateral carinae in metazona. Tympanic auricles of fore tibiae not inflated. Fore wings unmodified. Hind wings rudimentary.

Discussion. It is in males of the genus *Horatosphaga* Schaum that the stridulatory specializations of the fore wings which typify the Acrometopae reach their fullest expression. A general picture of these modifications may be gained from Text-fig. 1. It will be seen that a longitudinal groove has developed at the base of area MA and that the cross-veins of areas C and MA have become arranged in a closely parallel fashion.

It is also in this genus that the sexual dimorphism which is shown by all the Acrometopae reaches its extreme form. The type of intersexual differences shown by the more typical members of *Horatosphaga* Schaum is shown in Text-fig. 1. In species such as *H. somali* (Schulthess) and *H. ruspolii* (Schulthess), in which fully winged males are associated with brachypterous females, the difference is further enhanced, and indeed the two sexes bear little resemblance to each other.

At the present stage of our knowledge of the genus, where a number of species is known by the male sex only and in which several species doubtless remain to be described, it would be premature to segregate the species into formal groups. Moreover, it is possible that when further material permits a more extensive study of the group it will be found desirable to put some of the species into distinct genera. In an attempt, however, to give some idea of the interrelationships of the known species of *Horatosphaga* Schaum, I give below a list of them grouped according to their more obvious affinities.

(*a*) Typical members of the genus :

H. serrifera Schaum
H. leggei (Kirby)
H. gracilis (Sjöstedt)
H. linearis (Rehn)
H. longipes (Bolivar)
H. heteromorpha (Karsch,
H. media sp. n.
H. stylifera (Karny)
H. stuhlmanni (Karsch)
H. somali (Schulthess)
H. magna sp. n.
H. elongata (Rehn)
H. regularis (Bolivar)
H. concava sp. n.

(*b*) Species in which the males have no hind wings and narrow, reduced fore wings :

H. nuda sp. n.
H. meruensis (Sjöstedt)

(*c*) Species in which the males have no hind wings and broad, reduced fore wings :

H. nomima (Karsch)
H. montivaga (Sjöstedt)

(*d*) Species in which the males have no hind wings, reduced fore wings, and a somewhat enlarged tenth abdominal tergite :

H. elgonis (Chopard)

(*e*) Species in which the males (which may or may not have hind wings) have a greatly enlarged, usually knob-like, tenth abdominal tergite :

H. ruspolii (Schulthess)
H. diminuta (Chopard)
H. vicina (Chopard)
H. inclusa (Karsch)
H. crosskeyi sp. n.

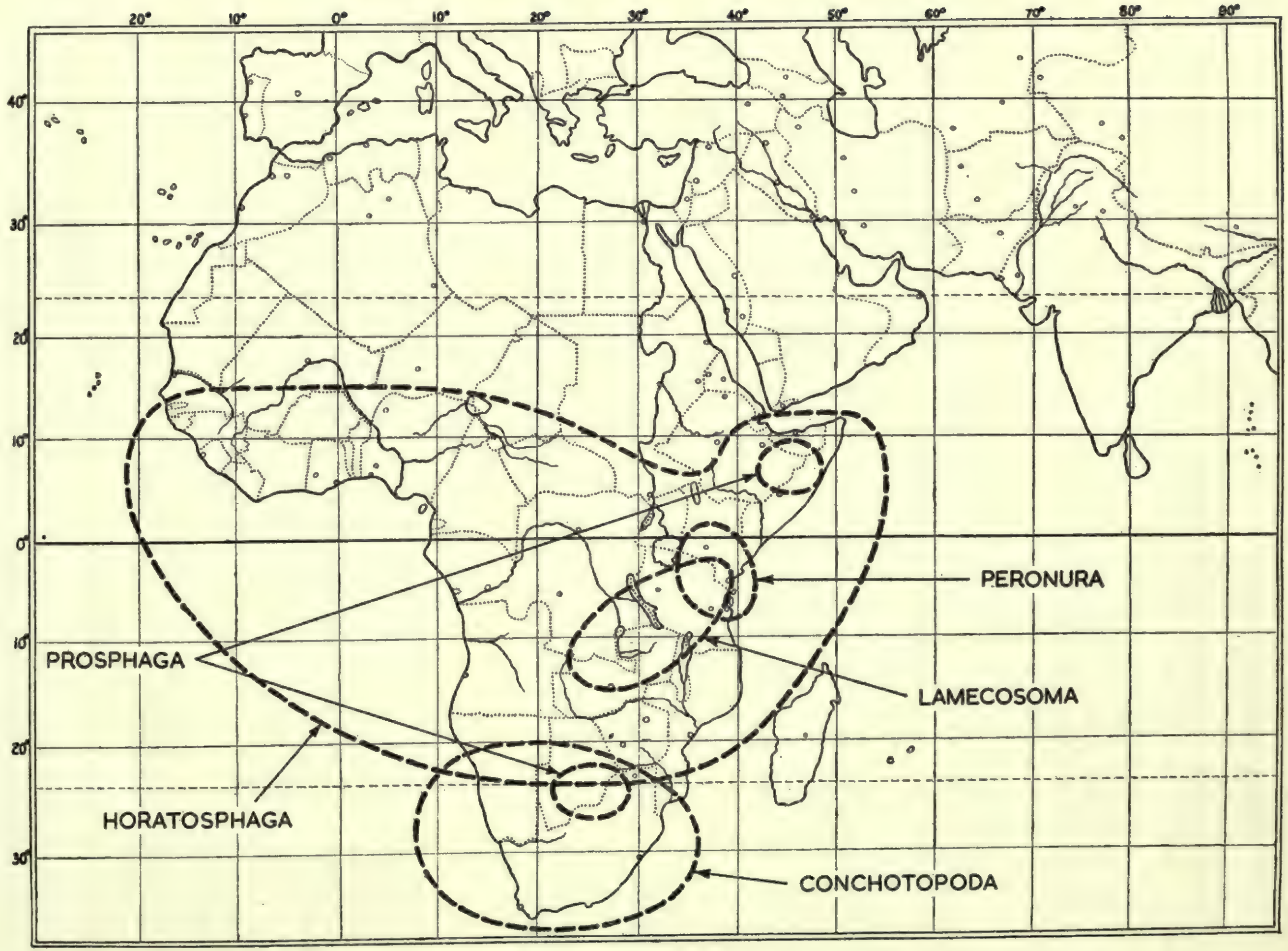
DISTRIBUTION (Text-fig. 44). Although *Horatosphaga* Schaum covers the whole of tropical Africa except for the dry northern fringe formed by the Sahara Desert, it is nevertheless typically an East African genus. Of the twenty-four known species only two (*H. inclusa* (Karsch) and *H. crosskeyi* sp. n.) occur west of the 10° E. line of longitude. The majority of the species are confined to British East Africa and Rhodesia, and many of these to quite small areas within these regions. Five species (*H. somali* (Schulthess), *H. magna* sp. n., *H. ruspolii* (Schulthess), *H. diminuta* (Chopard), and *H. vicina* (Chopard)) occur only in the semi-desert area of eastern Africa, north of the equator, and a further species, *H. heteromorpha* (Karsch), extends only a little further south. *H. stylifera* (Karny) is apparently confined to South West Africa and Angola, and the widespread species *H. serrifera* Schaum extends southwards into the more northerly part of South West Africa. The tropic of Capricorn probably marks the approximate southern limit of the genus ; the Acrometopae occurring south of this tropic all belong to either *Conchotopoda* Karsch or *Prosphaga* gen. n.

KEY TO THE SPECIES

Due to the fact that the females of many of the species lack features of diagnostic importance this key is based entirely on males. If it is necessary to identify female specimens which are not associated with males, reference should be made to the illustrations of the female fore wings (Text-figs. 81–98) and ovipositors (Text-figs. 99–119). This should narrow the field considerably, and comparison with the measurements and distribution of the species thus suggested may well produce a fairly certain identification. In some of the species, however, a definite identification is impossible in the absence of the male sex.

Species which could agree with either half of any one of the couplets given below are keyed out twice.

1. Tenth abdominal tergite greatly enlarged, as in Text-figs. 45–55 2
–. Tenth abdominal tergite not as in Text-figs. 45–55, unmodified or only slightly enlarged 7
2. Hind femora less than 21 mm. in length. Genitalia as in Text-fig. 53 *H. elgonis* (Chopard) (p. 312)
–. Hind femora more than 21 mm. in length. Genitalia not as in Text-fig. 53 . . . 3
3. Tenth abdominal tergite as in Text-figs. 45–52. (East African species) . . . 4
–. Tenth abdominal tergite as in Text-figs. 54 and 55. (West African species) . . . 6
4. Hind wings fully developed . . . . . . *H. ruspolii* (Schulthess) (p. 313)
–. Hind wings greatly reduced or rudimentary 5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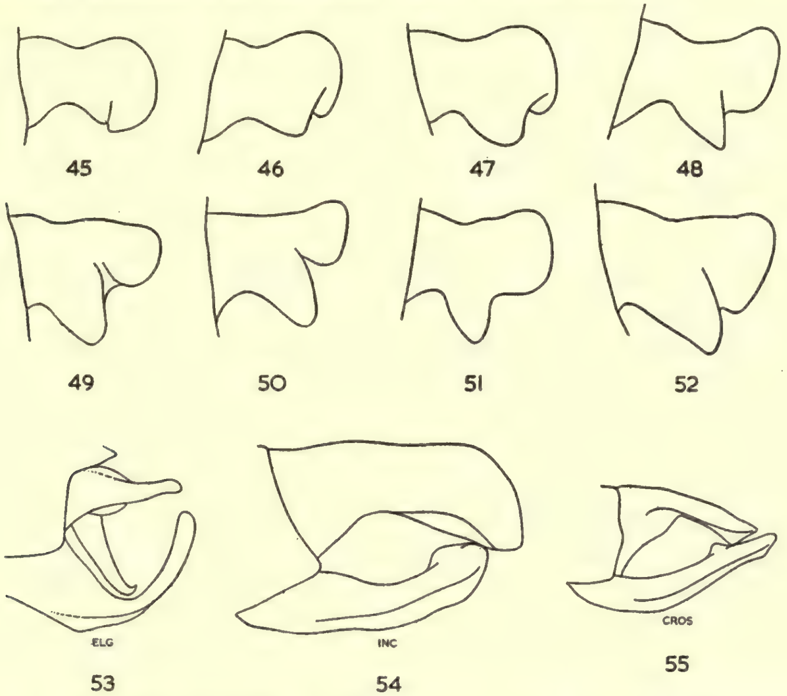
10°
20°
30°
PERONURA
PROSPHAGA
LAMECOSOMA
HORATOSPHAGA
CONCHOTOPODA

FIG. 44. Map showing the approximate distribution of the five genera of African Acrometopae.

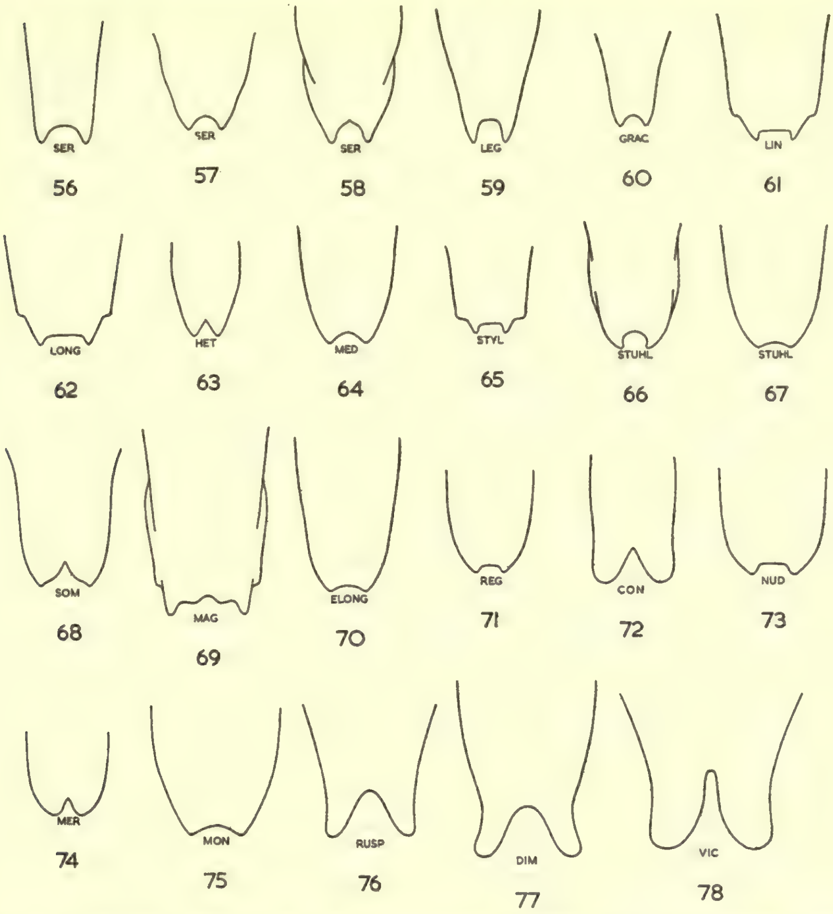
5. Median length of the pronotum more than 6·5 mm. . . *H. vicina* (Chopard) (p. 316)
–. Median length of the pronotum less than 6·5 mm. . *H. diminuta* (Chopard) (p. 315)
6. Genitalia as in Text-fig. 55. R_s of the fore wings usually bifurcate *H. crosskeyi* sp. n. (p. 318)
–. Genitalia as in Text-fig. 54. R_s of the fore wings unbranched *H. inclusa* (Karsch) (p. 317)
7. Hind wings absent or vestigial 8
–. Hind wings well developed or at least half the length of the fore wings . . . 11



FIGS. 45–55. *Horatosphaga* Schaum. 45–50. Lateral view of the male tenth abdominal tergite of *H. ruspolii* (Schulthess) from (45) Turkana, (46) south of Lake Rudolph, (47) El Carre, (48) Lak Telangor, and (49 and 50) Damassa. 51 and 52. Lateral view of the male tenth abdominal tergite of *H. diminuta* (Chopard) from (51) Moyale, and (52) Marsabit. 53–55. Lateral view of the male genitalia of (53) *H. elgonis* (Chopard); (54) *H. inclusa* (Karsch); (55) *H. crosskeyi* sp. n.

8. Fore wings broad, as in Text-figs. 33 and 34, about three times longer than their maximum width 9
–. Fore wings narrower, as in Text-figs. 31 and 32, about four times longer than their maximum width 10
9. Pronotal disc strongly verrucose. Fore wings with black spots *H. montivaga* (Sjöstedt) (p. 311)
–. Pronotal disc not verrucose (though rather rugose). Fore wings without black spots . . . . *H. nomima* (Karsch) (p. 311)
10. Fore wings shaped as in Text-fig. 32; R bifurcate in the proximal half of the wing *H. meruensis* (Sjöstedt) (p. 310)
—. Fore wings shaped as in Text-fig. 31; R unbranched or bifurcate in the distal half of the wing . . . . *H. nuda* sp. n. (p. 309)

11. Hind wings protruding a little beyond the fore wings, when at rest, or at least extending to the same point 13
—. Hind wings considerably shorter than the fore wings, when at rest . . . 12
12. Venation of the fore wings as in Text-fig. 18. Subgenital plate as in Text-fig. 62. (Kenya Highlands) . . . . *H. longipes* (Bolivar) (p. 295)
—. Venation of the fore wings as in Text-fig. 28. Subgenital plate as in Text-fig. 70. (Edward-Kivu rift-valley) . . *H. elongata* (Rehn) (brachypterous form) (p. 306)
13. R_s of the fore wings unbranched, as in Text-figs. 17, 19, or 30 14
—. R_s of the fore wings bifurcate, not as in Text-figs. 17, 19, or 30 17
14. Tenth abdominal tergite markedly emarginate posteriorly, as in Text-fig. 79 *H. concava* sp. n. (p. 308)
—. Tenth abdominal tergite unmodified 15
15. Subgenital plate as in Text-fig. 61 . . . . . . *H. linearis* (Rehn) (p. 294)
—. Subgenital plate as in Text-figs. 63 or 70 16
16. M of the fore wings running closely parallel to R_s for some distance and then suddenly diverging from it, as in Text-fig. 19 . . . *H. heteromorpha* (Karsch) (p. 296)
—. Fore wings not as in Text-fig. 19 . . . . . . *H. elongata* (Rehn) (p. 306)
17. Subgenital plate with a protuberance on each side near the tip, as in Text-figs. 65 or 69 18
—. Subgenital plate tapering evenly, or almost so, or smoothly parallel-sided, not as in Text-figs. 65 or 69 19
18. Total length more than 50 mm. Venation of the fore wings as in Text-fig. 26. (East Africa) . . . . *H. magna* sp. n. (p. 304)
—. Total length less than 50 mm. Venation of the fore wings as in Text-fig. 22. (Angola and South West Africa) . . . . *H. stylifera* (Karny) (p. 301)
19. M of the fore wings running closely parallel to R_s for some distance and then suddenly diverging from it, as in Text-fig. 20 *H. heteromorpha* (Karsch) (southern form) (p. 296)
—. Fore wings not as in Text-fig. 20 20
20. Total length less than 35 mm. Venation of the fore wings as in Text-figs. 16, 23, or 28 21
—. Total length more than 35 mm. Venation of the fore wings not as in Text-figs. 16, 23, or 28 23
21. Venation of the fore wings as in Text-fig. 16 (Kenya Highlands) *H. gracilis* (Sjöstedt) (p. 294)
—. Venation of the fore wings as in Text-figs. 23 or 28. (Edward-Kivu rift-valley) . 22
22. Fore wings broad, their venation as in Text-fig. 23. *H. stuhlmanni* (Karsch) (southern form) (p. 301)
—. Fore wings narrower, their venation as in Text-fig. 28 *H. elongata* (Rehn) (brachypterous form) (p. 306)
23. Fore wings unusually transparent, their venation as in Text-fig. 25. (Ethiopia, Somaliland, or Somalia) . . . . . . *H. somali* (Schulthess) (p. 303)
—. Fore wings of the usual texture for the genus, their venation usually rather different from Text-fig. 25. (Not known from the countries mentioned) . . . 24
24. Anterior medial area of the fore wings broadened in the middle, its cross-veins strongly arched towards the wing-tip, as in Text-figs. 14, 15 and 24 25
—. Anterior medial area of the fore wings only slightly or not at all broadened in the middle, its cross-veins not arranged as in Text-figs. 14, 15 and 24 . . . 26
25. Stridulatory rib of the left fore wing very prominent and more than 3 mm. in length. Venation of the fore wings as in Text-fig. 24 . . *H. stuhlmanni* (Karsch) (p. 301)
—. Stridulatory rib of the left fore wing not particularly prominent and usually less than 3 mm. in length. Venation of the fore wings as in Text-figs. 14 or 15 *H. leggei* (Kirby) (p. 291)
26. Venation of the fore wings as in Text-fig. 21 ; R_s usually dividing nearer the base than the tip of the wing. . . . . *H. media* sp. n. (p. 299)
—. Venation of the fore wings not as in Text-fig 21 ; R_s dividing in the distal half of the wing 27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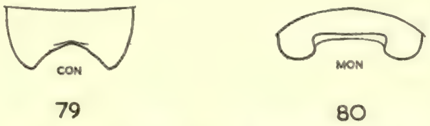
FIGS. 56–78. Ventral view of the male subgenital plate of (56) *Horatosphaga serrifera* Schaum (Northern Rhodesia) ; (57) *H. serrifera* Schaum (South West Africa) ; (58) *H. serrifera* Schaum (Nyasaland) ; (59) *H. leggei* (Kirby) ; (60) *H. gracilis* (Sjöstedt) ; (61) *H. linearis* (Rehn) ; (62) *H. longipes* (Bolivar) ; (63) *H. heteromorpha* (Karsch) ; (64) *H. media* sp. n. ; (65) *H. stylifera* (Karny) ; (66) *H. stuhlmanni* (Karsch) (Mahagi Port) ; (67) *H. stuhlmanni* (Karsch) (Rutshuru) ; (68) *H. somali* (Schulthess) ; (69) *H. magna* sp. n. ; (70) *H. elongata* (Rehn) ; (71) *H. regularis* (Bolivar) ; (72) *H. concava* sp. n. ; (73) *H. nuda* sp. n. ; (74) *H. meruensis* (Sjöstedt) ; (75) *H. montivaga* (Sjöstedt) (*H. nomima* (Karsch) is similar) ; (76) *H. ruspolii* (Schulthess) ; (77) *H. diminuta* (Chopard) ; (78) *H. vicina* (Chopard).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FIGS. 79 and 80. Dorsal view of the male tenth abdominal tergite of (79) *Horatosphaga concava* sp. n. ; (80) *H. montivaga* (Sjöstedt) (*H. nomima* (Karsch) is similar).

27. Hind femora more than 30 mm. in length . . . *H. serrifera* Schaum (p. 288)
—. Hind femora less than 30 mm. in length 28
28. Venation of the fore wings as in Text-fig. 24 ; stridulatory rib of the left fore wing very prominent and more than 3 mm. in length . *H. stuhlmanni* (Karsch) (p. 301)
—. Venation of the fore wings as in Text-figs. 27, 28, or 29 ; stridulatory rib of the left fore wing not particularly prominent and usually less than 3 mm. in length. . 29
29. Venation of the fore wings as in Text-figs. 27 or 28. (Eastern Belgian Congo) *H. elongata* (Rehn) (p. 306)
—. Venation of the fore wings as in Text-figs. 29. (Not known from Belgian Congo) *H. regularis* (Bolivar) (p. 307)

1. ***Horatosphaga serrifera*** Schaum, 1853

Horatosphaga serrifera Schaum, 1853, *Ber. Preuss. Akad. Wiss. Berlin*, **1853** : 778. Holotype ♀, MOZAMBIQUE (*Peters*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

Pantolepta vosseleri Karny, 1910, *Denkschr. med.-naturw. Ges. Jena*, **16** : 52. Ten ♂ syntypes, SOUTH WEST AFRICA : Okahandja (*Dinter*). One ♂ syntype, SOUTH WEST AFRICA : Kung-Buschmannland (*Lübbert*). All in the Zoologisches Museum of the Humboldt-Universität, Berlin. ***Syn. n.***

Pantolepta multivenosa Chopard, 1935, *Mem. Mus. zool. Univ. Coimbra* (1) **85** : 2. Holotype ♂, MOZAMBIQUE : Nova Chupanga, nr. Chemba, ii.1929 (*Lesne*). In the Muséum National d'Histoire Naturelle, Paris. ***Syn. n.***

DIAGNOSIS. ♂. Venation of fore wings as in Text-figs. 11, 12, and 13. Hind femora with dorsal ridge at apex, ending in small spine. Subgenital plate as in Text-figs. 56 and 57.

♀. Venation of fore wings as in Text-fig. 81. Hind femora with dorsal ridge at apex, ending in small spine. Ovipositor as in Text-figs. 99 and 100.

MEASUREMENTS

Males

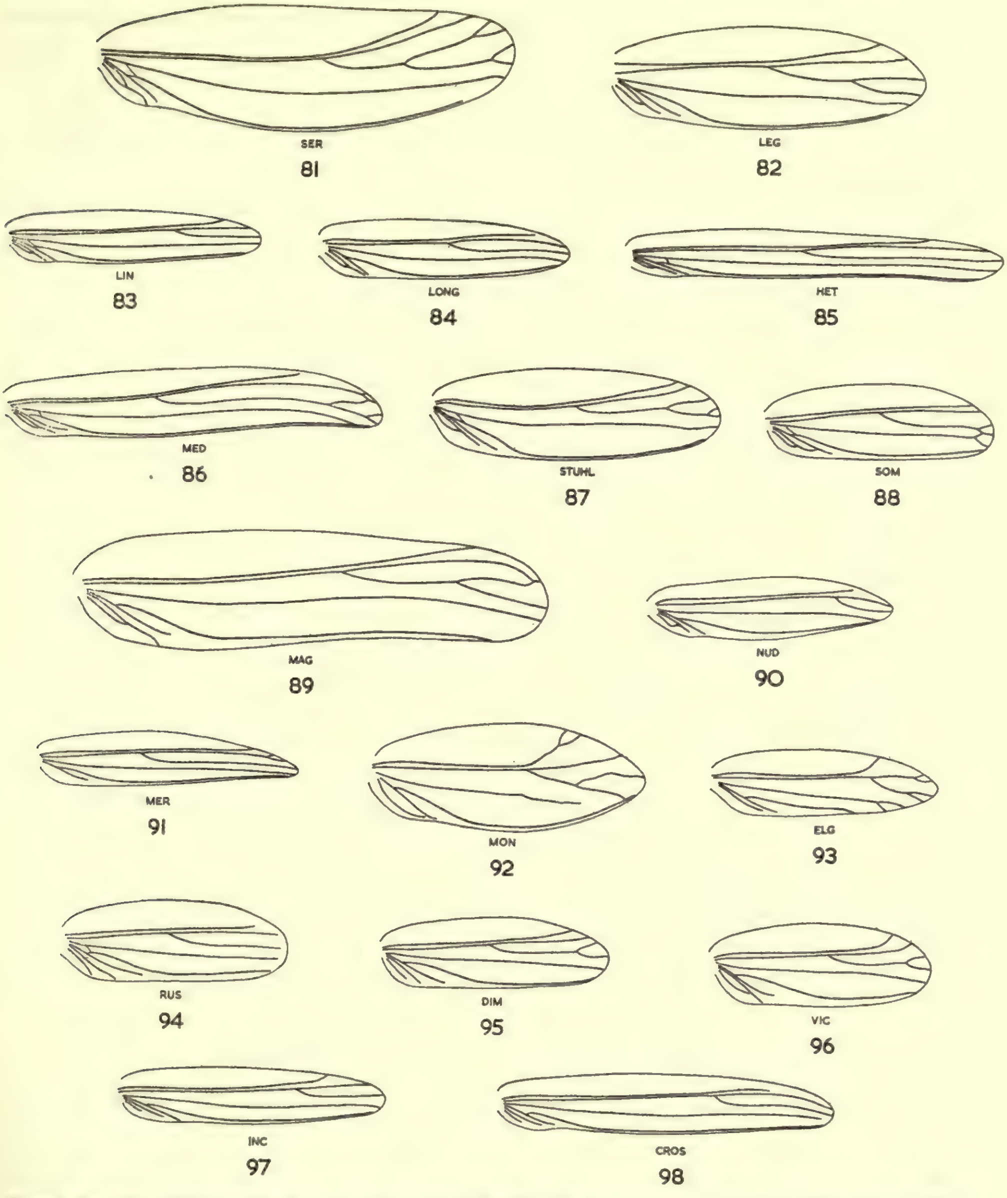
Total length (20) : 44·8–50·9, mean 48·31.
Median length of pronotum (20) : 5·6–6·9, mean 6·37.
Length of hind femur (20) : 31·6–37·8, mean 35·44.
Length of fore wing (20) : 35·8–42·6, mean 39·02.

Females

Total length (20) : 36·0–45·5, mean 40·54.
Median length of pronotum (20) : 6·4–7·6, mean 7·05.
Length of hind femur (20) : 29·7–35·3, mean 33·50.
Length of fore wing (20) : 28·5–35·3, mean 32·02.
Length of ovipositor (20) : 9·0–14·7, mean 12·58.

DISCUSSION. This species shares with *H. leggei* (Kirby) and *H. gracilis* (Sjöstedt) the small spine at the tip of the hind femur, though this character is occasionally rather feebly developed in the present species. The males of *H. serrifera* Schaum may be distinguished from these two species by the venation of the fore wings, and the females differ from those of *H. leggei* (Kirby) by their much longer fore wings and larger ovipositor. (The female sex of *H. gracilis* (Sjöstedt) is as yet unknown.)

H. serrifera Schaum shows distinct geographical variation, and doubtless it will be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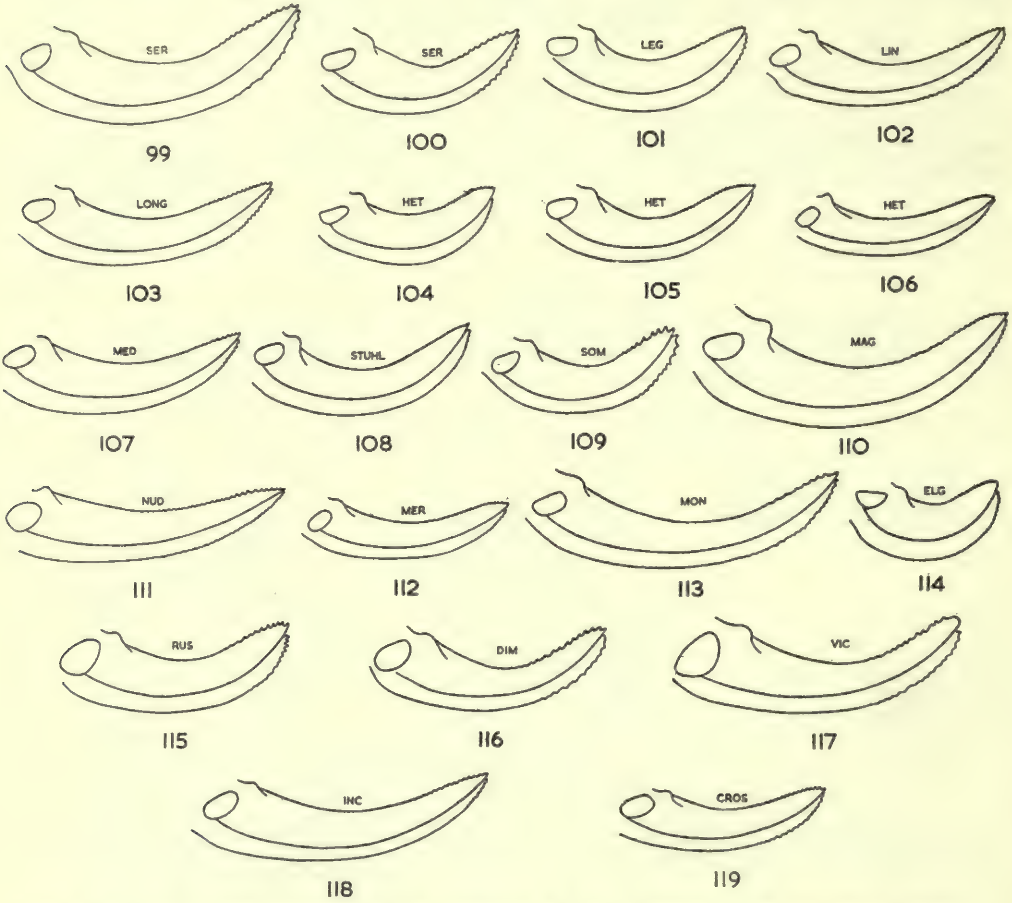
FIGS. 81–98. The right female fore wing of (81) *Horatosphaga serrifera* Schaum ; (82) *H. leggei* (Kirby) ; (83) *H. linearis* (Rehn) ; (84) *H. longipes* (Bolivar) ; (85) *H. heteromorpha* (Karsch) ; (86) *H. media* sp. n. ; (87) *H. stuhlmanni* (Karsch) ; (88) *H. somali* (Schulthess) ; (89) *H. magna* sp. n. ; (90) *H. nuda* sp. n. ; (91) *H. meruensis* (Sjöstedt) ; (92) *H. montivaga* (Sjöstedt) ; (93) *H. elgonis* (Chopard) ; (94) *H. ruspolii* (Schulthess) ; (95) *H. diminuta* (Chopard) ; (96) *H. vicina* (Chopard) ; (97) *H. inclusa* (Karsch) ; (98) *H. crosskeyi* sp. n.

possible to delimit subspecies when more material is available. In males of the typical form, probably occurring over a large part of the low grass savanna and open woodland of Mozambique, Rhodesia, Angola, and south-eastern Belgian Congo, the venation of the fore wings is of the type shown in Text-figs. 11 and 12. In the much drier semi-desert areas of South West Africa and the coastal fringe of southern Angola, however, the venation of the male fore wings takes the form shown in Text-fig. 13, with area R extending further towards the wing-base. Females from this part of Africa have a considerably smaller ovipositor (Text-fig. 100) than those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Figs. 99–119. Lateral view of the ovipositor of (99) *Horatosphaga serrifera* Schaum (Northern Rhodesia) ; (100) *H. serrifera* Schaum (South West Africa) ; (101) *H. leggei* (Kirby) ; (102) *H. linearis* (Rehn) ; (103) *H. longipes* (Bolivar) ; (104) *H. heteromorpha* (Karsch) (Kenya, Mombasa) ; (105) *H. heteromorpha* (Karsch) (Kenya, Marsabit) ; (106) *H. heteromorpha* (Karsch) (Ethiopia, Harar) ; (107) *H. media* sp. n. ; (108) *H. stuhlmanni* (Karsch) ; (109) *H. somali* (Schulthess) ; (110) *H. magna* sp. n. ; (111) *H. nuda* sp. n. ; (112) *H. meruensis* (Sjöstedt) ; (113) *H. montivaga* (Sjöstedt) ; (114) *H. elgonis* (Chopard) ; (115) *H. ruspolii* (Schulthess) ; (116) *H. diminuta* (Chopard) ; (117) *H. vicina* (Chopard) ; (118) *H. inclusa* (Karsch) ; (119) *H. crosskeyi* sp. n.

of the typical form (Text-fig. 99). If further material shows that delimitation of subspecies would be useful, this deserticolous form would take the name *vosseleri* Karny, 1910 (type locality : South West Africa).

Examination of a syntype of *Pantolepta vosseleri* Karny and the holotype of *P. multivenosa* Chopard has convinced me that these specimens are conspecific with the holotype of *H. serrifera* Schaum. The association of males with females in this species has been greatly facilitated by a long series of both sexes collected by Burr in Northern Rhodesia.

MATERIAL EXAMINED

♀ holotype. One ♂ syntype (Kung-Buschmannland) of *Pantolepta vosseleri* Karny. ♂ holotype of *P. multivenosa* Chopard.

KENYA : Rabai, iv–vi.1928 (*van Someren*) (4♂, 1♀) ; BELGIAN CONGO : Albertville, i.1919 (Mayné) (2♂) (Mus. Congo Belge) ; NYASALAND : Zomba, 1947 (*Lennon*) (1♂) ; ——, 31.iii.1913 (*Neave*) (1♀) ; NORTHERN RHODESIA : Luano Valley, Chisorwe, i–iv.1928 (*Burr*) (61♂, 29♀) ; SOUTHERN RHODESIA : Queque (——) (1♂) (S. A. Mus.) ; ANGOLA : Quirimbo, v.1934 (*Jordan*) (1 ♂) ; Amboim, 22.iv.1927 (*Burr*) (1♂) ; —— (1♂) ; SOUTH WEST AFRICA : Okahandja, ii–iii.1928 (*Turner*) (1 ♂, 1 ♀).

In the British Museum (Natural History) unless otherwise stated.

DISTRIBUTION. This species is distributed throughout tropical Africa south of the equator.

2. **Horatosphaga leggei** (Kirby, 1909) comb. n.

Thaumatoxenia leggei Kirby, 1909, *Trans. zool. Soc. Lond.* **19** : 65. Lectotype ♂, UGANDA : E. Ruwenzori, Mubuku Valley, 6,000 ft., xii.1905 (*Legge & Wollaston*). One ♂ syntype, UGANDA : E. Ruwenzori, Mubuku Valley, 6,000 ft., 13.i.1906 (*Legge & Wollaston*). Both in the British Museum (Natural History).

Horatosphaga robusta Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 156. Holotype ♀, BELGIAN CONGO : 90 km. west of Albert-Nyanza, 1,600 m., forest (*Grauer*). In the Zoologisches Museum of the Humboldt-Universität, Berlin. ***Syn. n.***

Conchotopoda amplipennis Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 165. Holotype ♂, BELGIAN CONGO : Lake Kivu, Idjwi I., ix.1907 (*Schubotz*). In the Zoologisches Museum of the Humboldt-Universität, Berlin. ***Syn. n.***

Peronura affinis Bolivar, 1922, *Voy. M. Rothschild E. Afr. Anim. Art.* **1** : 198. Holotype ♀, KENYA : Escarpment, viii-ix.1904 (*Rothschild*). In the Muséum National d'Histoire Naturelle, Paris. ***Syn. n.***

DIAGNOSIS. ♂. Venation of fore wings as in Text-figs. 14 and 15 ; cross-veins of area MA strongly curved outwards. Hind femora with dorsal ridge at apex, ending in small spine. Subgenital plate as in Text-fig. 59.

♀. Venation of fore wings as in Text-fig. 82. Hind femora with dorsal ridge at apex, ending in small spine. Ovipositor as in Text-fig. 101. Pronotum with well-developed lateral carinae in metazona.

MEASUREMENTS

Males

Total length (20) : 37·5–49·2, mean 44·45.
Median length of pronotum (20) : 4·7–6·2, mean 5·41.
Length of hind femur (20) : 23·5–30·3, mean 27·80.
Length of fore wing (20) : 29·6–40·2, mean 35·50.

MEASUREMENTS—(*cont.*)

Females

Total length (20) : 28·3–34·2, mean 31·43.
Median length of pronotum (20) : 4·8–5·9, mean 5·41.
Length of hind femur (20) : 20·5–27·1, mean 23·92.
Length of fore wing (20) : 22·8–28·0, mean 24·72.
Length of ovipositor (20) : 7·3–9·5, mean 8·54.

DISCUSSION. This is the most common species of ***Horatosphaga*** Schaum in the highlands of British East Africa and eastern Belgian Congo. The males may be easily recognized by the broad fore wings with the strongly arcuate cross-veins in the anterior medial area. The short ovipositor with very small serrations and the relatively broad fore wings serve to distinguish the females from the other East African species of the genus.

I have selected and marked one of the syntypes of *H. leggei* (Kirby) as a lectotype ; this specimen was marked as " type " by Kirby, but his selection of it as type was not published. The holotypes of *H. robusta* Rehn, *Conchotopoda amplipennis* Rehn, and *Peronura affinis* Bolivar, were examined and found to be conspecific with the lectotype of *H. leggei* (Kirby).

MATERIAL EXAMINED

♂ lectotype and ♂ syntype. ♀ holotype of *H. robusta* Rehn. ♂ holotype of *Conchotopoda amplipennis* Rehn. ♀ holotype of *Peronura affinis* Bolivar.

UGANDA: Ruwenzori Range, Kilembe, 4,500 ft., xii.1934–i.1935 (*Edwards*) (2♂, 1 ♀); Namanve, 17.ix.1933 (*Johnston*) (2 ♂) ; Bugoma Forest, Bunyora, 5.vi.1935 (*Johnston*) (1 ♂) ; Bugoma Forest, vi.1933 (*Johnston*) (2 ♂, 2 ♀) ; Mabira Forest, vi.1934 (*Johnston*) (4 ♂) ; Mabira Forest, vi–ix.1913 (*Gowdey*) (2 ♂, 2 ♀) ; Mabira area, v.1938 (*Taylor*) (3 ♀) ; Mubende, 18.x.1933 (*Johnston*) (1 ♀) ; Kigezi, x.1934 (*Buxton*) (1 ♂, 1 ♀) ; Kigezi, Kashenji, 7,000 ft., hill scrub, xi.1935 (*Johnston*) (1 ♀) ; Sczibwa Falls, 16.iv.1933 (*Johnston*) (1 ♂) ; Kawanda, 3.ii.1940 (*Hargreaves*) (1 ♂) ; Entebbe, viii.1912 (*Wiggins*) (1 ♂) ; Kampala, 18.i.1935 (*Hargreaves*) (1 ♀) ; Kampala, 20.vii.1934 (*Hargreaves*) (1 ♀) ; Masaka, Kalisizo, 18.v.1935 (*Johnston*) (1 ♀) ; Tero Forest, vii.1912 (*Gowdey*) (1 ♂, 3 ♀) ; KENYA : Nairobi, 6,000 ft. (*Andrews*) (1 ♂) ; Kaimosi, iii–iv.1932 (——) (1 ♀) ; Songhor, ix.1917 (*Dry*) (1 ♀) ; TANGANYIKA : Tshibinda, 21–27.viii.1931 (*Mackie*) (2 ♂, 9 ♀) ; Rukwa Valley, 23.ii.1957 (*Whellan*) (1 ♂) ; Old Shinyanga, at light, iv–vi.1953 (*Burtt*) (8 ♂) ; Bukoba, ix.1921 (*Miller*) (2 ♀) ; BELGIAN CONGO : Djugu, Ituri Forest, open edge of forest, cleared ground, 5.x.1935 (*Johnston*) (1 ♂) ; Mt. Ruwenzori, Kalunge, 7,200 ft., 6.vii.1935 (*Brédo*) (1 ♂) ; Ruwenzori, Kalonge, vii.1937, (*Brédo*) (1 ♂, 1 ♀) (Mus. Congo Belge) ; Ruwenzori, Kalonge, 2,050 m., viii.1932 (*Burgeon*) (2 ♂, 1 ♀) (Mus. Congo Belge) ; Kalonge, Riv. Mushuva, 15.xii.1949 (*Marlier*) (1 ♂, 1 ♀) (Mus. Congo Belge) ; Lac Kivu, Rwankwi, iv–v.1948 (*Leroy*) (2 ♂) (Mus. Congo Belge) ; Kivu, Costermansville, 1951 (*Bomans*) (1 ♂, 1 ♀) (Mus. Congo Belge); W. Kivu, Kashusha, 1937 (*Vandelannoite*) (17 ♂, 4 ♀) (Mus. Congo Belge); Kivu, Kabwe, 23.xi.1932 (*Burgeon*) (1 ♂) (Mus. Congo Belge); Kivu, Tshibinda, xi.1927 (*Seydel*) (1 ♂) (Mus. Congo Belge): Kivu, Kapanga, 1952 (*Froidebise*) (1 ♂) (Mus. Congo Belge); Kivu, Lulenga, 24.ix.1932 (*Burgeon*) (2 ♂) (Mus. Congo Belge); Kivu, Kamisimbi, 21.vi.1938 (*Hendrickx*) (1 ♂) (Mus. Congo Belge); Kivu, Tshibinda, 2.xii.1932 (*Burgeon*) (1 ♂) (Mus. Congo Belge); Kivu, Terr. Kabare, Katana, xii.1954 (——) (1 ♀) (Mus. Congo Belge); Kivu, Terr. Kabare, Lwiro, x.1953 (——) (1 ♂, 2 ♀) (Mus. Congo Belge); Kivu, Lubero, 10.xii.1935 (*Brédo*) (2 ♂, 4 ♀) (Mus. Congo Belge); Kivu, Kirrenyi, 1924 (*Saceghem*) (1 ♀) (Mus. Congo Belge); Kivu, Kahuzi, 15.v.1938 (*Hendrickx*) (1 ♀) (Mus. Congo Belge); Kivu, Mt. Kahuzi, ix.1951–ii.1952 (*Bomans*) (1 ♂, 1 ♀) (Mus. Congo Belge); NE. Kivu, La Matura, iii.1928 (*Seydel*) (1 ♀) (Mus. Congo Belge); Kivu, Buseregenye, 1930 (*Luja*) (1 ♀) (Mus. Congo Belge); Kivu, Goma, 10.ii.1937 (*Brédo*) (2 ♀) (Mus. Congo Belge); Kivu, Niamlagira, 2,700 m., 29.ix.1932 (*Burgeon*) (2 ♀) (Mus. Congo Belge); Kivu, Bwito, 1,700 m., ix.1934 (*Marlier*) (1 ♀) (Mus. Congo Belge); Kivu, Lwiro-Katana, i–ii.1954 (——) (1 ♀) (Mus. Congo Belge); Kivu, Mulungu, 1939 (*Hendrickx*) (2 ♀) (Mus. Congo Belge); Kivu, Lubero, Mulo, 1,960 m., vi–vii.1953 (*Célis*) (1 ♀) (Mus. Congo Belge); Kivu, Kapanga, 1952 (*Froidebise*) (1 ♀) (Mus. Congo Belge); Kivu, Loashi, 1,350 m., 28–30.ix.1949 (*Laurent*) (4 ♀) (Mus. Congo Belge); Kivu, Masisi, 1938 (*Le Moult*) (3 ♂, 3 ♀) (Zool. Inst. Lund); Kibali-Ituri, Geti, 1934 (*Scops*) (1 ♂) (Mus. Congo Belge); Kibali-Ituri, Kilo, 18.x.1930 (*Soleil*) (1 ♀) (Mus. Congo Belge); Ituri, Kilo, 1930 (*Soleil*) (1 ♀) (Mus. Congo Belge); Ituri, Lubero, 1928 (*van Riel*) (1 ♂) (Mus. Congo Belge); Ituri, Lubero, 1,900 m., 1928 (*van Riel*) (1 ♂) (Mus. Congo Belge); Ituri, Bulembo, xii.1928 (*van Riel*) (1 ♂) (Mus. Congo Belge); Buta, 1937 (*Hutsebaut*) (2 ♂, 1 ♀) (Mus. Congo Belge); Volcan Sabinjo, Bunagana, 1935 (*Brédo*) (9 ♂, 5 ♀) (Mus. Congo Belge); Volcan Nyamlagira, 5.i.1936 (*Brédo*) (2 ♂) (Mus. Congo Belge); Rutshuru, v.1938 (*Ghesquière*) (1 ♂, 1 ♀) (Mus. Congo Belge); Rutshuru, 15.v.1936 (*Lippens*) (1 ♀) (Mus. Congo Belge); Mongbwalu, 1937 (*Harford-Jordens*) (2 ♂) (Mus. Congo Belge); Kamogobe, 8.iii.1936 (*Lippens*) (1 ♂) (Mus. Congo Belge); Lake Tanganyika, Nyanza, 28.xii.1932 (*Burgeon*) (1 ♂) (Mus. Congo Belge); Kilo, i.1940 (*Maristes*) (1 ♂) (Mus. Congo Belge); Ruanda, Rutovu, Forêt du Rugege, 2,350 m., 20–23.i.1953 (*Basilewsky*) (3 ♂, 1 ♀) (Mus. Congo Belge); Beni (*Borgerhoff*) (2 ♀) (Mus. Congo Belge); Mombassa, viii.1932 (*Burgeon*) (1 ♀) (Mus. Congo Belge); Masisi-Walikale (*Bonnevie*) (3 ♀) (Mus. Congo Belge); Lesse (*Bonnevie*) (2 ♀) (Mus. Congo Belge); Region des Lacs (*Sagona*) (3 ♀) (Mus. Congo Belge); Dungu, 1912 (*Hutereau*) (1 ♀) (Mus. Congo Belge); Urundi, Kanyinya, 1,500 m., xii.1947–i.1948 (*Dames de Marie*) (1 ♀) (Mus. Congo Belge); Urundi, Muyeha, 1,700 m., 13.vii.1952 (*Laurent*) (2 ♀) (Mus. Congo Belge); Nyongwe, Forêt Rugege, 2,000 m., viii.1949 (*Laurent*) (1 ♀) (Mus. Congo Belge).

In the British Museum (Natural History) unless otherwise stated.

Distribution. *H. leggei* (Kirby) ranges over all the higher parts of British East Africa and eastern Belgian Congo. It is not yet known from south of the Rukwa Valley or from anywhere below 1,500 ft.

3. *Horatosphaga gracilis* (Sjöstedt, 1912) comb. n.

Keniacola gracilis Sjöstedt, 1912, *Ark. Zool.* **7** (38) : 14. Holotype ♂, KENYA : Mt. Kenya, Urwald, 21.iii.1911 (*Lönnberg*). In the Naturhistoriska Riksmuseum, Stockholm.

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 16. Hind femora with dorsal ridge at apex, ending in small spine. Subgenital plate as in Text-fig. 60.

♀ unknown.

MEASUREMENTS

Males

Total length (3) : 32·3–33·4, mean 32·87.
Median length of pronotum (4) : 4·4–5·0, mean 4·70.
Length of hind femur (3) : 18·5–21·0, mean 19·83.
Length of fore wing (4) : 24·2–26·4, mean 25·40.

DISCUSSION. This species may be distinguished from *H. leggei* (Kirby) and *H. serrifera* Schaum, which also have the small spine at the tip of the hind femur, by its much smaller size and the venation of the male fore wings.

MATERIAL EXAMINED

♂ holotype.

KENYA : Mt. Kenya, viii–x.1927 (*Insoll*) (2 ♂) (British Museum (Natural History)) ; Kiambu, 1936 (*Anderson*) (1 ♂) (Zool. Inst. Lund).

DISTRIBUTION. This species is so far known only from a small area of the highlands of central Kenya. It is probably confined to high ground and quite possibly shows a preference for the temperate forest vegetation associated with the localities mentioned above.

4. *Horatosphaga linearis* (Rehn, 1914) comb. n.

Conchotopoda linearis Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 167. Holotype ♂, UGANDA : Mpororo, 1.vii.1907 (*Schubotz*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

? *Pachypyga karschi* Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 161. Holotype ♀, BELGIAN CONGO : Ruanda, Lake Mohasi, 29.vii.1907 (*Schubotz*). In the Zoologisches Museum of the Humboldt-Universität, Berlin. (See below.)

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 17 ; R_s unbranched. Hind femora with feebly developed dorsal ridge at apex, usually ending in small point. Subgenital plate as in Text-fig. 61.

♀. Venation of fore wings as in Text-fig. 83. Hind femora with feebly developed dorsal ridge at apex, usually ending in small point. Ovipositor as in Text-fig. 102. Fore wings often with dark spots along basal half of anterior margin.

MEASUREMENTS

Males

Total length (11) : 33·1–37·8, mean 35·58.
Median length of pronotum (9) : 3·5–4·6, mean 4·23.
Length of hind femur (9) : 24·6–27·8, mean 26·33.
Length of fore wing (11) : 24·1–27·3, mean 25·84.

Females

Total length (5) : 26·7–29·5, mean 27·90.
Median length of pronotum (6) : 4·6–5·4, mean 5·01.
Length of hind femur (5) : 21·8–24·2, mean 23·30.
Length of fore wing (6) : 20·5–24·0, mean 21·95.
Length of ovipositor (6) : 10·1–11·3, mean 10·68.

DISCUSSION. The venation of the fore wings and the shape of the subgenital plate are characteristic of the male of this species. The female sex may be distinguished from *H. stuhlmanni* (Karsch) by the fore wings and the ovipositor, which are both more slender, but does not seem to differ from *H. longipes* (Bolivar) by any constant character.

The holotype of *Pachypyga karschi* Rehn appears to differ from females of *H. linearis* (Rehn) by only the narrower fore wings. The high variability of the species suggests the possibility that this specimen is also a female of *H. linearis* (Rehn), but the material available at present is inadequate to establish a definite synonymy.

MATERIAL EXAMINED

♂ holotype. ♀ holotype of *Pachypyga karschi* Rehn.

BELGIAN CONGO : Ruanda, Kagera, Gahinga, 26–30.iv.1937 (*Brédo*) (5 ♂, 2 ♀) (Mus. Congo Belge) ; Kivu, Goma, 10.ii.1937 (*Brédo*) (1 ♀) (Mus. Congo Belge) ; UGANDA : Ankole, Lwasamaire, upland grassland, 22.xi.1935 (*Johnston*) (2 ♂, 1 ♀) ; Bulemezi, Luwero, rough tuft grass, 7.xi.1935 (*Johnston*) (1 ♂) ; Ankole, Lutobo, rough ground, xi.1935 (*Johnston*) (1 ♂) ; Ankole, Bukinda, rough ground, 27.xi.1935 (*Johnston*) (1 ♀) ; Mbarara, i.1934 (*Johnston*) (1 ♀) ; TANGANYIKA : Old Shinyanga, Boma, 4.iv.1935 (*Burtt*) (1 ♂).

In the British Museum (Natural History) unless otherwise stated.

DISTRIBUTION. The data listed above suggest that this species is most abundant in the mountainous area to the east of Lake Kivu, though also occurring in southern Uganda and northern Tanganyika.

5. ***Horatosphaga longipes*** (Bolivar, 1922) comb. n.

Peronura longipes Bolivar, 1922, *Voy. M. Rothschild E. Afr. Anim. Art.* **1** : 197. Holotype ♀, KENYA : Naivasha, 1906 (*Rothschild*). In the Muséum National d'Histoire Naturelle, Paris.

DIAGNOSIS. ♂. Hind wings not extending beyond fore wings, when at rest, though at least half their length. Venation of fore wings as in Text-fig. 18. Subgenital plate as in Text-fig. 62.

♀. Venation of fore wings as in Text-fig. 84. Ovipositor as in Text-fig. 103. Fore wings often with dark spots along basal half of anterior margin.

MEASUREMENTS

Males

Total length (1) : 29·5.
Median length of pronotum (2) : 5·5–5·6, mean 5·55.
Length of hind femur (2) : 23·5–25·7, mean 24·6.
Length of fore wing (2) : 22·6–25·3, mean 23·95.

MEASUREMENTS—(*cont.*)

Females

Total length (7) : 24·6–28·9, mean 27·56.
Median length of pronotum (7) : 5·1–5·7, mean 5·55.
Length of hind femur (7) : 19·1–23·6, mean 21·71.
Length of fore wing (7) : 17·8–22·4, mean 21·01.
Length of ovipositor (7) : 9·7–11·6, mean 10·76.

DISCUSSION. Males of this species may be distinguished from the brachypterous form of *H. elongata* (Rehn) (of which females are so far unknown), which has hind wings of a similar size, by the subgenital plate, the venation of the fore wings, and the inflated tympanic auricles. The shape of the male subgenital plate is a character shared only by *H. linearis* (Rehn) (apart from the much more southerly species *H. stylifera* (Karny)), and it is possible that these two species represent parallel montane developments from a more widespread common stock.

MATERIAL EXAMINED

♀ holotype.

KENYA : Lake Elmenteita, 14.vii.1950 (*Uvarov*) (1 ♂, 2 ♀) ; Eb Urra, iv–v. 1900 (*Betton*) (1 ♂, 2 ♀) ; Gelegele R., vi.1913 (*Luckman*) (1 ♀) ; Aberdare Mts., Ngobit, 7,000 ft., xi.1945 (*Buxton*) (1 ♀).

All in the British Museum (Natural History).

DISTRIBUTION. This species is probably confined to the Kenya Highlands.

6. ***Horatosphaga heteromorpha*** (Karsch, 1888) comb. n.

Pantolepta heteromorpha Karsch, 1888, *Berl. ent. Z.* **32** : 430. One ♂ lectotype and one ♀ syntype, KENYA : Mombasa, xii.1876 (*Hildebrandt*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

Plegmatoptera hoehneli Brunner, 1891, Additamenta zur Monographie der Phaneropteriden, p. 44. Holotype ♀, TANGANYIKA : Kilimanjaro (*Hoehnel*). In the Naturhistorisches Museum, Vienna. ***Syn. n.***

Euthyphlebia parallela Schulthess, 1898, *Ann. Mus. Stor. nat. Genova*, **39** : 205. Holotype ♂, ETHIOPIA : Dolo, v.1893 (*Ruspoli*). In the Museo Civico di Storia Naturale, Genoa. ***Syn. n.***

Pantolepta kilimandjarica Sjöstedt, 1909, *Wiss. Ergebn. Schwed. Zool. Expdn. Kilimandjaro, Meru*, 1905-06, **17** : 132. Lectotype ♂, TANGANYIKA : Mt. Meru, Ngare na nyuki, i.1906 (*Sjöstedt*). Probably over thirty syntypes of both sexes, some from TANGANYIKA : Mt. Meru, Ngare na nyuki, ix.1905–i.1906, others from TANGANYIKA : Kilimanjaro, Kibonoto, 1,800 m., xi.1905–iv.1906. Lectotype and most of syntypes in the Naturhistoriska Riksmuseum, Stockholm ; one ♂ syntype (TANGANYIKA : Mt. Meru, Ngare na nyuki, xi.1905 (*Sjöstedt*)) in the British Museum (Natural History). ***Syn. n.***

Plegmatoptera gracilis Bolivar, 1922, *Voy. M. Rothschild E. Afr. Anim. Art.* **1** : 198. Holotype ♂, KENYA : Loroghi Mtns., 1905 (*Rothschild*). In the Muséum National d'Histoire Naturelle, Paris. ***Syn. n.***

DIAGNOSIS. ♂. Venation of fore wings as in Text-figs. 19 and 20. Hind femora often with dorsal ridge at apex, sometimes ending in small spine. Subgenital plate as in Text-fig. 63.

♀. Fore wings, when flexed, usually extending well beyond hind knees ; venation as in Text-fig. 85. Hind femora often with dorsal ridge at apex, sometimes ending in small spine. Ovipositor as in Text-figs. 104, 105, and 106.

MEASUREMENTS

Males

Total length (20) : 31·5–43·3, mean 38·32.
Median length of pronotum (19) : 4·1–5·0, mean 4·51.
Length of hind femur (20) : 23·3–29·5, mean 26·36.
Length of fore wing (20) : 23·3–32·1, mean 28·64.

Females

Total length (15) : 35·1–43·6, mean 38·47.
Median length of pronotum (18) : 4·6–6·1, mean 5·20.
Length of hind femur (14) : 22·6–30·1, mean 25·21.
Length of fore wing (15) : 29·2–35·8, mean 31·87.
Length of ovipositor (19) : 7·4–10·1, mean 8·64.

DISCUSSION. Males of this species may be easily recognized by the venation of the fore wings, especially the manner in which R_s and MA run closely parallel for an appreciable distance before MA bends rather suddenly towards the hind margin. The females are characterized by the long fore wings, which usually extend well beyond the hind knees.

This species shows remarkable individual and geographical variation, and it is difficult with the material available at present to distinguish between these two components of its variability. The degree of attentuation is very variable ; this is shown best by the shape of the fore wings and their venation, and, in the female, by the shape of the pronotum and ovipositor. The most attenuate forms come from the northernmost part of the range, in Ethiopia and British Somaliland. Here, R_s is typically unbranched in the male fore wings (Text-fig. 19) and those of the female are extremely long and narrow ; in the latter sex the pronotum is relatively attenuate and the ovipositor (Text-fig. 106) longer and more slender than in more southerly specimens. The opposite extreme is shown by material from the vicinity of Mombasa : R_s is often branched in the male fore wings (Text-fig. 20), and in the female the pronotum, fore wings, and ovipositor (Text-fig. 104), are much less attenuate. The difference between the extreme forms of ovipositor (cf. Text-figs. 104 and 106) is extraordinary and in other Phaneropterinae would suggest a generic distinction. Material from other parts of the range is generally intermediate between these two forms. Geographical variation is also shown by the terminal spine of the hind femur, which is well developed in the Mombasa specimens, poorly developed in material from most areas, and quite absent in specimens from the northernmost localities. Two female specimens collected at 7,000–8,000 ft. on

Mt. Meru had relatively shorter fore wings than the remaining females, which were all from lower altitudes.

Though sometimes obscured (and sometimes enhanced) by individual variation, the geographical effect is nevertheless a real one, and when more material is available it will doubtless be possible to delimit subspecies. The cause of the variation is almost certainly climatic, the more attenuate specimens coming from the most dry part of the range and the opposite extreme from the wettest.

In view of the foregoing remarks, it is easy to understand why this species should have been named five times. Ruwenzori provides the type locality for two of these names, and the remaining three are widely spread over the remainder of the range, including the localities of the two extreme forms mentioned above. The holotypes were examined in every instance except *Euthyphlebia parallela* Schulthess ; in the latter case Dr. Capra of the Museo Civico di Storia Naturale, Genoa, very kindly supplied a description of the relevant characters and a photograph of the fore wing. There can be no doubt that all five names refer to the same species.

I have selected and marked a male lectotype of this species. I have also selected and marked a lectotype from among the syntypes of *Pantolepta kilimandjarica* Sjöstedt ; this specimen already carried a red type label.

MATERIAL EXAMINED

♂ lectotype. ♀ holotype of *Plegmatoptera hoehneli* Brunner. ♂ lectotype and two female syntypes of *Pantolepta kilimandjarica* Sjöstedt. ♂ holotype of *Plegmatoptera gracilis* Bolivar.

ETHIOPIA : Harar, 12.vi.1955 (*Uvarov*) (1 ♂, 1 ♀) ; Wambar Mariam, Mt. Zuquála, *c.* 7,000 ft., dry grass, 28.x.1926 (*Scott*) (1 ♂) ; Geldi, 30.viii.1949 (*Bellehu*) (1 ♂) ; nr. Valencheti, at light, 11.v.1948 (*Guichard*) (1 ♂) ; BRITISH SOMALILAND : Burao distr., El Humah, 18.x.1935 (*Peck*) (1 ♂, 1 ♀) ; Hargeisa, 4,100 ft., dry season, x.1932 (*Taylor*) (1 ♂) ; SOMALIA : Mogadiscio, 5.vi.1955 (*Uvarov*) (1 ♂) ; KENYA : Makindu, 1.111.1954 (*Waloff*) (1 ♂) ; Marsabit, vi.1934 (L. R. R. V. E.) (3 ♂, 3 ♀) ; Mombasa, Shimba Hills, iv.1955 (——) (1 ♂) (National Museum of Southern Rhodesia) ; Mombasa I., Kilindini, v–vi.1955 (Brown) (1 ♂, 1 ♀); Mandera distr., Damassa, 03° 04′ N., 41° 20′ E., desert grass and thorn-bush, 17.xii.1944 (*Kevan*) (5 ♂, 1 ♀) ; Moyale distr., Yasere, 03° 30′ N., 38° 35′ E., thorn-bush, 14.vi.1946 (*Kevan*) (1 ♂, 1 ♀) ; Moyale, N.F.D., cultivation, 8–10.vi.1947 (*Kevan*) (1 ♂, 1 ♀) ; Marsabit, N.F.D., upland grassland, 26.11.1944 (*Kevan*) (1 ♀) ; Marsabit, Chopa Gof, 02° 25′ N., 38° 03′ E., scrubby bushes, 13.vi.1946 (*Kevan*) (1 ♀) ; Samburu distr., vi.1944 (*Opiko*) (1 ♀) ; Mtito Andei, nr. Lushoto, 10.ii.1955 (*Haskell*) (1 ♂) ; TANGANYIKA : Kilimanjaro, 1916 (*West*) (1 ♂, 1 ♀) (S. A. Mus.) ; Kilimanjaro, 3,000–5,000 ft., x.1884 (*Johnston*) (2 ♂, 2 ♀) ; Mt. Meru, 7,000–8,000 ft., i.1938 (*Cooper*) (1 ♂, 2 ♀) ; Morogoro, 1931–32 (*Thompson*) (3 ♂) ; Songea, Litembo, 1,500 m., 20.ix.1952 (*Lindemann & Pavlitzki*) (1 ♂) (Zoologisches Staatssammlung, Munich).

In the British Museum (Natural History) unless otherwise stated.

DISTRIBUTION. This species occurs over most of the acacia semi-desert area of eastern Africa. It occurs on Kilimanjaro and has been found at a height of 7,000 ft. on Mt. Meru.

7. ***Horatosphaga media*** sp. n.

Holotype ♂, NORTHERN RHODESIA : Lusaka, x–xii.1956 (*King*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 21, R_s usually bifurcating nearer base than tip of wing. Subgenital plate as in Text-fig. 64.

♀. Venation of fore wings as in Text-fig. 86. Ovipositor as in Text-fig. 107.

DESCRIPTION. ♂. Fastigium of vertex sloping to frons, sulcate above.

Pronotum without lateral carinae. Fore femora with about 6–12 external spinules. Tympanic auricles of fore tibiae more or less strongly inflated. Mid femora with about 13–17 external spinules. Fore and mid femora usually with dorsal ridge at apex, often ending in small point. Hind femora with variable number of minute ventral spinules ; terminal dorsal spine rarely present. Hind tibiae with about 25–45 external dorsal spines. Venation of fore wings as in Text-fig. 21 R_s usually bifurcating nearer base than tip of wing.

Tenth abdominal tergite very slightly enlarged. Supra-anal plate rounded, flap-like. Cerci moderately robust, apex sharply incurved and pointed. Subgenital plate as in Text-fig. 64.

General coloration green. Top of head, antennae, disc of pronotum, stridulatory organ, hind edge of fore wings, and top of abdomen, usually reddish brown. Legs often partly reddish brown, especially above.

♀. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae or showing tendency towards their formation, especially in posterior half. Armature of legs as in male, except that terminal dorsal spine of hind femora is more often present. Tympanic auricles of fore tibiae not inflated ; tympanic apertures slit-like. Venation of fore wings as in Text-fig. 86.

Ovipositor as in Text-fig. 107 ; margins crenulate in distal half.

General coloration green. Anterior margin of fore wings whitish with reddish submarginal band ; posterior margin sometimes reddish. Abdomen often with series of dark red spots on each side.

MEASUREMENTS

Males

Total length (20) : 40·0–47·8, mean 43·95.
Median length of pronotum (20) : 4·7–5·9, mean 5·14.
Length of hind femur (20) : 23·7–32·3, mean 28·53.
Length of fore wing (20) : 30·0–37·8, mean 33·76.

Females

Total length (20) : 33·9–42·4, mean 37·77.
Median length of pronotum (20) : 5·4–6·9, mean 5·84.
Length of hind femur (17) : 24·4–30·4, mean 27·59.
Length of fore wing (20) : 26·3–34·7, mean 30·88.
Length of ovipositor (20) : 9·4–13·1, mean 11·10.

Variation. There is much variation in the armature of the legs. The degree of inflation of the tympanic auricles of the male fore tibiae is variable. The point at which R_s bifurcates in the fore wing varies a little in the male, and considerably in the female. There is much variation in the length of the ovipositor.

Discussion. The venation of the fore wings and the genitalia serve to distinguish both sexes of *H. media* sp. n. (Text-fig. 1) from the other members of the genus.

In view of the fact that many of the species of *Horatosphaga* Schaum have been described several times under different names, it seems strange that the present species, apparently quite common throughout Rhodesia, southern Belgian Congo, and south-west Tanganyika, should have remained undescribed; possibly the reason lies in the fact that very little of its range has ever been German territory, and that the principal past workers on the group have been German.

H. media sp. n. shows a certain amount of geographical variation. The most striking instance of this is the inflation of the tympanic auricles of the males, which is much more marked in the northern part of the range than in the southern part. When more material is available it may be possible to delimit subspecies.

Material examined

♂ holotype; 1 ♂ paratype, same data as holotype; 4 ♂ and 1 ♀ paratypes, Southern Rhodesia: 5–6 miles east of Lusaka, iii–vi.1956 (*King*); 1 ♂ paratype, Southern Rhodesia: Salisbury distr., Marlborough, i.1952 (*Lockbill*); 1 ♂ paratype, Southern Rhodesia: Salisbury distr., Widdecombe Park, 14.i.1950 (*Whellan*); 1 ♂ paratype, Southern Rhodesia: Salisbury distr., Widdecombe Park, 28.i.1948 (*Whellan*); 1 ♀ paratype, Southern Rhodesia: Salisbury distr., Widdecombe Park, 4.iii.1950 (*Whellan*); 1 ♀ paratype, Southern Rhodesia: Salisbury distr., Hatfield, 27.ii.1952 (*Whellan*).

Tanganyika: Tukuyu, 5,084 ft., ii.1924 (*Miller*) (2 ♂); Tukuyu, 21.viii.1924 (*Miller*) (1 ♂); Belgian Congo: Katanga, xii.1927 (*Burr*) (2 ♂); Elisabethville, iv.1939 (*Brédo*) (2 ♂) (Mus. Congo Belge); Elisabethville-Lubumbashi, v.1929 (*Seydel*) (2 ♂) (Mus. Congo Belge); Elisabethville, xi.1911 (*Miss. Agric.*) (1 ♂) (Mus. Congo Belge); Jadotville, 1948 (*Adelaide*) (1 ♂) (Mus. Congo Belge); Kinda, v–xii.1914 (*Charliers*) (1 ♂, 3 ♀) (Mus. Congo Belge); Lubumbashi, 20.v.1911 (*Stappers*) (1 ♂) (Mus. Congo Belge); Kasenga, xii.1937 (*Brédo*) (1 ♂, 1 ♀) (Mus. Congo Belge); Chunda, 20.xii.1907 (*Neave*) (1 ♂) (Mus. Congo Belge); Gandajika, xi–xii.1950 (*Francquen*) (2 ♂, 3 ♀) (Mus. Congo Belge); Kaniama, 1931 (*Massart*) (1 ♀) (Mus. Congo Belge); Nyangwe (*Mayné*) (1 ♀) (Mus. Congo Belge); Sankuru, Gandajika, 1953 (*Francquen*) (2 ♀) (Mus. Congo Belge); Sankuru, Gandajika, 30.vi.1950 (*Francquen*) (1 ♀) (Mus. Congo Belge); Lualaba, Kolwezi, iv.1954 (*Gilbert*) (1 ♀) (Mus. Congo Belge); Lualaba, Kolwezi, 15.iv.1953 (*Gilbert*) (1♂) (Mus. Congo Belge); Urundi, Bururi Makamba, 11–13.xii.1949 (*Laurent*) (1 ♀) (Mus. Congo Belge); Angola: Moxico distr., R. Luena, Katula, 18.v.1927 (*Burr*) (1 ♂, 1 ♀); Moxico distr., Busaco, 25.vi.1927 (*Burr*) (1 ♂); Moxico distr., R. Camasamba, trib. of R. Lumeje, 11.vi.1927 (*Burr*) (1 ♀); Kalukembe, xii.1932 (*Miss. sc. suisse*) (1 ♀); Northern Rhodesia: Congo Border, Kipushi, 9.iv.1928 (*Evans*) (1 ♂); Congo Border, Tshinsenda, 27.viii.1928 (*Evans*) (1 ♂); Kipushi, 2.i.1928 (*Burr*) (1 ♀) ; SOUTHERN RHODESIA : Salisbury, 1894 (*Marshall*) (1 ♂) (S. A. Mus.) ; Salisbury, 5,000 ft., ii–vi.1900 (*Marshall*) (2 ♂) ; Salisbury, 5,000 ft., x.1899 (*Marshall*) (1 ♂) ; Salisbury, 1905 (*Marshall*) (1 ♂) ; Salisbury, ii.1901 (*Marshall*) (1 ♀) ; Salisbury (*Dodds*) (1 ♀) (S. A. Mus.) ; Salisbury, 27.v.1912 (——) (1 ♀) (coll. Whellan) ; Salisbury, light trap, 7–8.ii.1957 (*Whellan*) (1 ♂) (coll. Whellan) ; Salisbury, Hatfield, on Aloe plant, 30.i.1957 (*Whellan*) (1 ♀) (coll. Whellan).

In the British Museum (Natural History) unless otherwise stated.

DISTRIBUTION. *H. media* sp. n. is distributed over much of Rhodesia, south-west Tanganyika, southern Belgian Congo, and the extreme east of Angola. The northernmost record is based on a female from Urundi, but the occurrence of this species at this latitude cannot be definitely established in the absence of the male sex.

8. ***Horatosphaga stylifera*** (Karny, 1910) comb. n.

Pantolepta stylifera Karny, 1910, *Denkschr. med.-naturw. Ges. Jena*, **16** : 51.

Holotype ♂, SOUTH-WEST AFRICA : Windhoek (*Gentz*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 22. Subgenital plate as in Text-fig. 65.

♀ unknown.

MEASUREMENTS

Males

Total length (5) : 40·5–42·9, mean 41·96.
Median length of pronotum (5) : 4·6–5·2, mean 4·87.
Length of hind femur (4) : 25·7–29·5, mean 27·70.
Length of fore wing (5) : 30·9–34·4, mean 32·72.

DISCUSSION. The subgenital plate of the male of this species is approached in shape by that of *H. linearis* (Rehn) and *H. longipes* (Bolivar), but the wing-venation is quite different and the terminal dorsal spine of the hind femora is almost or entirely absent.

MATERIAL EXAMINED

♂ holotype.

SOUTH-WEST AFRICA : Tsumeb, 1924 (*Brown*) (1 ♂) (S. A. Mus.) ; Okovango, Kuring Kuru, ii.1923 (*Dickman*) (1 ♂) (S. A. Mus.) ; ANGOLA : Tchitunda (——) (2 ♂).

In the British Museum (Natural History) unless otherwise stated.

DISTRIBUTION *H. stylifera* (Karny) is probably confined to South West Africa and Angola.

9. ***Horatosphaga stuhlmanni*** (Karsch, 1896) comb. n.

Conchotopoda stuhlmanni Karsch, 1896, *Stettin ent. Ztg.* **57** : 329. Holotype ♂, UGANDA (?) : Buginda, 11.vii.1894 (*Stuhlmann*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

Horatosphaga (?) ***kasindina*** Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 160. Holotype ♀, BELGIAN CONGO : Kasindi, i.1908. In the Zoologisches Museum of the Humboldt-Universität, Berlin. ***Syn. n.***

DIAGNOSIS. ♂. Venation of fore wings as in Text-figs. 23 and 24 ; stridulatory rib of left fore wing long and conspicuous. Subgenital plate as in Text-figs. 66 and 67.

♀. Venation of fore wings as in Text-fig. 87. Ovipositor as in Text-fig. 108.

MEASUREMENTS

Males

Total length (10) : 31·7–41·5, mean 34·50.
Median length of pronotum (10) : 4·6–5·5, mean 5·09.
Length of hind femur (10) : 23·5–28·5, mean 25·78.
Length of fore wing (10) : 23·9–33·9, mean 26·91.

Females

Total length (13) : 29·4–35·8, mean 31·70.
Median length of pronotum (12) : 5·0–6·7, mean 5·62.
Length of hind femur (12) : 22·0–26·2, mean 23·85.
Length of fore wing (13) : 23·3–27·3, mean 24·39.
Length of ovipositor (13) : 9·3–11·4, mean 10·33.

DISCUSSION. The males of this species may be recognized by their wing-venation and the simple form of the subgenital plate. The females have relatively broader fore wings than *H. linearis* (Rehn) and *H. longipes* (Bolivar), and these organs lack the dark spots shown by the latter (and often the former) species ; this sex may be distinguished from *H. leggei* (Kirby) by the much longer ovipositor.

Male specimens from the more southerly parts of the range (south of the equator) have very much shorter wings than is the case further north (cf. Text-figs. 23 and 24) ; the females show a similar tendency, though much less well marked. It will doubtless later be possible to delimit a southern subspecies, but the material available at present is quite inadequate for this purpose.

The holotype of *H. kasindina* Rehn was examined and found to be taxonomically indistinguishable from females of *H. stuhlmanni* (Karsch). It is rather unfortunate that this specimen comes from a locality almost on the equator, where the males may be intermediate in wing-length between the two forms mentioned above. If, therefore, the southern form is later given a subspecific name, it would be desirable for it to be given a new name and to be based on a male holotype from the vicinity of Lake Kivu.

MATERIAL EXAMINED

♂ holotype. ♀ holotype of *Horatosphaga kasindina* Rehn.

BELGIAN CONGO : Mabende, between Beni and Rutshuru, xii.1935 (*Brédo*) (4 ♂, 5 ♀) (Mus. Congo Belge) ; Rutshuru, v.1937 (*Ghesquière*) (1 ♂) (Mus. Congo

Belge) ; Kivu, Buseregenye, ix.1929 (*Luja*) (2 ♂, 1 ♀) (Mus. Congo Belge) ; Rutshuru, 8.v.1936 (*Lippens*) (1 ♂) (Mus. Congo Belge) ; Lake Kivu, Rwankwi (*Leroy*) (1 ♀) (Mus. Congo Belge) ; Lake Albert, Kasenyi, savannah bush, viii.1935 (*Johnston*) (1 ♀) ; Semliki Valley, Geti Falls, open bush, x.1945 (*Johnston*) (1 ♀) ; Semliki Valley, Atibu Falls, open bush, x.1935 (*Johnston*) (1 ♀) ; Mahagi Port, short grass plains near lake, 28.ix.1935 (*Johnston*) (1 ♂, 1 ♀).

In the British Museum (Natural History) unless otherwise stated.

DISTRIBUTION. This species is apparently confined to the Albert-Edward-Kivu rift-valley.

10. ***Horatosphaga somali*** (Schulthess, 1898) comb. n.

Peronura somali Schulthess, 1898, *Ann. Mus. Stor. nat. Genova*, **39** : 200. Holotype ♀, SOMALIA : Lugh, iv–v.1893 (*Ruspoli*). In the Museo Civico di Storia Naturale, Genoa.

Rhegmatopoda peeli Burr, 1900, *Proc. zool. Soc. Lond.* **1900** : 44. Holotype ♂, BRITISH SOMALILAND : Whardi Datal, 26.vii.1895 (*Peel*). In the University Museum, Oxford. ***Syn. n.***

DIAGNOSIS. ♂. Fore wings of transparent texture ; venation as in Text-fig. 25. Subgenital plate as in Text-fig. 68.

♀. Fore wings much reduced ; venation as in Text-fig. 88. Ovipositor as in Text-fig. 109.

MEASUREMENTS

Males

Total length (7) : 38·5–43·4, mean 41·49.
Median length of pronotum (7) : 4·7–5·8, mean 5·19.
Length of hind femur (5) : 26·6–29·4, mean 27·48.
Length of fore wing (6) : 29·5–33·9, mean 32·75.

Females

Total length (3) : 25·2–26·8, mean 26·07.
Median length of pronotum (2) : 6·0–6·6, mean 6·30.
Length of hind femur (3) : 26·0–27·7, mean 26·90.
Length of fore wing (3) : 18·2–18·7, mean 18·40.
Length of ovipositor (3) : 8·6–8·8, mean 8·70.

DISCUSSION. The extreme transparency of the male fore wings of this species is approached only by *H. magna* sp. n. and *H. serrifera* Schaum. The former of these two species is much larger than *H. somali* (Schulthess) ; the latter of the two is not known from north of the equator and differs in wing-venation, male subgenital plate, and ovipositor.

Females of this species often have a white band along the anterior margin of the fore wing ; the veins are sometimes brown in colour, thus contrasting with the general green colour of the remainder of the wing. The brown coloration of the wing-veins is also shown by some female specimens of *H. diminuta* (Chopard) and *H. ruspolii* (Schulthess), and is usually associated with brown pigmentation along the top of the head and pronotum. This type of colour variation seems to be connected with deserticolous habits.

Dr. F. Capra of the Museo Civico di Storia Naturale, Genoa, has very kindly sent me a photograph and description of the female holotype of this species. The extreme similarity between the females of *H. diminuta* (Chopard), *H. ruspolii* (Schulthess), and the present species, made it difficult to be certain which species this holotype represents. The sexual dimorphism shown by the genus has, furthermore, made it no easy task to associate female specimens with the male holotype of *Rhegmatopoda peeli* Burr (which was available for study). A very careful comparison has, however, been made, and the synonymy of the latter species with *H. somali* (Schulthess) was established on this basis.

MATERIAL EXAMINED

♂ holotype of *Rhegmatopoda peeli* Burr.

BRITISH SOMALILAND: Bohotlewein, 26.x.1952 (*Stephenson*) (1 ♂); Haud, 8° 28′ N., 45° 38′ E., 2,500 ft., night, 25.v.1932 (*Taylor*) (1 ♂); Hargeisa, 5.vi.1957 (*Roffey*) (1 ♂); Las Anod, 16.xi.1935 (*Peck*) (1 ♀); SOMALIA: Lugh Ferrandi, 11.xi.1953 (*Popov*) (1 ♂); ETHIOPIA: Danot, 25.xi.1953 (*Popov*) (3 ♂); N. Ogaden, El Rago, 26.xi.1953 (*Popov*) (2 ♀).

All in the British Museum (Natural History).

DISTRIBUTION. *H. somali* (Schulthess) is confined to the acacia semi-desert of eastern Africa.

11. **Horatosphaga magna** sp. n.

Holotype ♂, ETHIOPIA: Ogaden, nr. Scillare, 23.xi.1953 (*Popov*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Fore wings exceeding 50 mm. in length; venation as in Text-fig. 26. Subgenital plate as in Text-fig. 69.

♀. Fore wings exceeding 40 mm. in length; venation as in Text-fig. 89. Ovipositor as in Text-fig. 110.

DESCRIPTION. ♂. Fastigium of vertex sloping to frons, sulcate above.

Pronotum without lateral carinae. Fore femora with about 10–15 external spinules. Tympanic auricles of fore tibiae moderately to strongly inflated. Mid femora with about 11–18 external spinules. Fore and mid femora usually with dorsal ridge at apex, not ending in point. Hind femora with about 10–20 external spinules; terminal dorsal spine absent or almost so. Hind tibiae with about 20–40 external dorsal spines. Fore wings of shiny and rather transparent texture; venation as in Text-fig. 26.

Tenth abdominal tergite unmodified. Supra-anal plate flap-like, rounded or tending to be triangular. Cerci moderately robust, apex incurved and pointed. Subgenital plate as in Text-fig. 69.

General coloration green. Top of head, antennae, disc of pronotum, greater part of legs, stridulatory organ, and parts of abdomen, reddish brown.

♀. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae, though showing tendency towards their formation posteriorly.

Armature of legs as in male, except that all femora often have terminal dorsal points and hind femora have about 17–23 external spinules. Tympanic auricles of fore tibiae not inflated ; tympanic apertures slit-like. Venation of fore wings as in Text-fig. 89.

Ovipositor as in Text-fig. 110 ; margins crenulate in distal half.

General coloration green. Top of head, antennae, disc of pronotum, and parts of legs, with variable amount of reddish brown (sides of pronotal disc sometimes black). Anterior edge of fore wings usually whitish, especially near base.

MEASUREMENTS

Males

Total length (4) : 56·9–61·2, mean 58·92.
Median length of pronotum (4) : 7·1–7·9, mean 7·54.
Length of hind femur (5) : 35·9–40·0, mean 38·36.
Length of fore wing (4) : 46·2–50·7, mean 48·42.

Females

Total length (4) : 48·1–57·8, mean 51·30.
Median length of pronotum (4) : 8·3–9·1, mean 8·77.
Length of hind femur (4) : 35·9–40·6, mean 38·58.
Length of fore wing (4) : 36·6–46·4, mean 40·65.
Length of ovipositor (4) : 12·9–14·3, mean 13·70.

VARIATION. There is much variation in the armature of the legs. The degree of inflation of the tympanic auricles of the male fore tibiae is variable. The extent to which the terminal dorsal point of the female femora is developed varies greatly, and it is possible that this feature may be sometimes present in males. The male subgenital plate is rather variable in shape. The coloration varies greatly : the brown colouring is sometimes almost absent.

DISCUSSION. *H. magna* sp. n. is the largest known species of the genus. The males have the general appearance of a much larger version of *H. somali* (Schulthess) ; apart from size, the venation of the fore wings enables the males of these two species to be easily distinguished (cf. Text-figs. 25 and 26). The fore wings of the females of *H. magna* sp. n. are well developed, unlike the reduced female fore wings of *H. somali* (Schulthess).

This species appears to be quite closely related to *H. serrifera* Schaum ; the chief differences lie in the male subgenital plate and the shape of the female fore wings. It seems very likely that *H. magna* sp. n. has developed comparatively recently from a deserticolous subspecies of *H. serrifera* Schaum. The range of the latter species extends over the whole of the low grass savanna and dry woodland of south and central Africa, but reaches its northernmost point at the southern limit of the semi-desert of eastern Africa. As far as is known at present, the two species are completely allopatric.

MATERIAL EXAMINED

♂ holotype ; 3 ♂ and 2 ♀ paratypes, same data as holotype ; 1 ♂ paratype, ETHIOPIA : Danot, 25.xi.1953 (*Popov*).

KENYA : Marsabit, Chopa Gof, 02° 25′ N., 38° 03′ E., scrubby bushes, 13.vi.1946 (*Kevan*) (2 ♀).

All in the British Museum (Natural History).

DISTRIBUTION. *H. magna* sp. n. probably occurs over a large part of the acacia semi-desert area of eastern Africa.

12. ***Horatosphaga elongata*** (Rehn, 1914) comb. n.

Conchotopoda elongata Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 163. Holotype ♂, BELGIAN CONGO : Usumbura, xi–xii. 1907 (*von Stegmann & Stein*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

? *Horatosphaga* (?) *kandti* Rehn, 1914, *Wiss. Ergebn. Zentral-Afrika-Exp.* **5** : 167. Holotype ♀, BELGIAN CONGO : Lake Kivu (*Kandt*). In the Zoologisches Museum of the Humboldt-Universität, Berlin. (See below.)

DIAGNOSIS. ♂. Venation of fore wings as in Text-figs. 27 and 28. Hind femora with dorsal ridge at apex, usually ending in spine or point. Subgenital plate as in Text-fig. 70.

♀ unknown (but see below).

MEASUREMENTS (mostly unavailable due to poorness of material)

Males

Median length of pronotum (2) : 4·8–5·5, mean 5·15.
Length of hind femur (2) : 25·4–28·3, mean 26·85.

DISCUSSION. This species occupies a rather anomalous position in the genus. Although quite a large amount of material of *Horatosphaga* Schaum has been available for study from the provinces of Kivu, Ruanda, and Urundi, no specimens have been found which correspond exactly with the holotype (locality : Usumbura) or paratype (locality : Lake Kivu) of *H. elongata* (Rehn). Four male specimens from this part of Belgian Congo, however, differ only by their shorter wings, and probably represent a rather brachypterous form of the species. In the fore wings of three of these specimens (from Uvira and Costermansville, Kivu, and Nyangwe, Ruanda) R_s is unbranched ; in the fourth (from Kahondo, Kivu) this vein is branched, though not so distinctly as in the holotype and paratype (cf. Text-figs. 27 and 28).

The simple form of the male subgenital plate of this species is approached by *H. stuhlmanni* (Karsch). In view of the fact that the latter species already shows considerable geographical variation in wing-length, it is just possible that *H. elongata* (Rehn) is another extreme variant of it.

As the female holotype of *H. kandti* Rehn bears the same data as the male paratype of *H. elongata* (Rehn), and these two specimens are the only ones of the genus collected on this expedition to do so, it seems quite likely that the former specimen is a female of the present species. However, this female specimen is indistinguishable from females of *H. linearis* (Rehn), which are also known from the same locality, and it is quite impossible to establish a definite synonymy at this stage of our knowledge of the group.

MATERIAL EXAMINED

♂ holotype; ♀ paratype, BELGIAN CONGO: Lake Kivu (Kandt) (same depository as holotype). ♀ holotype of *H. kandti* Rehn.

BELGIAN CONGO: Kivu, Uvira, xii.1952 (*Basilewsky*) (1 ♂) (Mus. Congo Belge); Kivu, Kahondo, 29.v.1938 (*Hendrickx*) (1 ♂) (Mus. Congo Belge); Kivu, Costermansville, 1951 (*Bomans*) (1 ♂) (Mus. Congo Belge); Ruanda, Nyangwe, viii–xi.1946 (*Scholl*) (1 ♂) (Mus. Congo Belge).

DISTRIBUTION. The known distribution of this species is confined to the provinces of Kivu, Ruanda, and Urundi.

13. **Horatosphaga regularis** (Bolivar, 1922) comb. n.

Eupantolepta regularis Bolivar, 1922, *Voy. M. Rothschild E. Afr. Anim. Art.* **1**: 200. Holotype ♂, KENYA: south of Lake Rudolph, 1905 (*Rothschild*). In the Muséum National d'Histoire Naturelle, Paris.

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 29. Subgenital plate as in Text-fig. 71.

♀ unknown.

MEASUREMENTS

Males

Total length (1): 42·2.
Median length of pronotum (1): 5·3.
Length of hind femur (1): 25·0.
Length of fore wing (2): 29·4–32·7, mean 31·05.

DISCUSSION. This species resembles *H.* elongata (Rehn) in its wing-venation, and is equally puzzling in its status. Although a few specimens from various localities in eastern Africa bear quite a close resemblance to the holotype, none corresponds exactly and only one specimen, from Kenya, can be regarded with any confidence as being conspecific. The possibility that these two specimens represent a form of *H. elongata* (Rehn) cannot be ruled out. A third specimen, from the Rukwa Valley, Tanganyika, may also belong to this complex, and rather suggests that the group may be confined in distribution to the rift-valleys of eastern Africa.

It is just possible that the holotype of *Plegmatoptera reticulata* Karsch, 1888 (type locality; Lake Tanganyika) is a female of this species. *H. regularis* (Bolivar) is the only species of the genus occurring in this part of Africa of which the female is not yet known, and the dimensions of the holotype of *P. reticulata* Karsch, which are given below, conform quite well with this possibility.

Plegmatoptera reticulata Karsch, 1888, *Berl. ent. Z.* **32** : 429. Holotype ♀, TANGANYIKA : Lake Tanganyika (*Reichard*). In the Zoologisches Museum of the Humboldt Universität, Berlin.

Measurements of holotype (total length unmeasurable).
Median length of pronotum : 5·7.
Length of hind femur : 28·9.
Length of fore wing : 25·0.
Length of ovipositor : 18·0.

MATERIAL EXAMINED

♂ holotype.

KENYA : ——, 18.xi.1919 (——) (1 ♂) (British Museum (Natural History)).

DISTRIBUTION. The two known specimens of this species are from Kenya.

14. *Horatosphaga concava* sp. n.

Holotype ♂, UGANDA : Gulu, v.1925 (*Carpenter*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Tenth abdominal tergite enlarged, markedly emarginate posteriorly (Text-fig. 79). Venation of fore wings as in Text-fig. 30 ; R_s unbranched. Subgenital plate as in Text-fig. 72, with rounded lobes.

♀ unknown.

DESCRIPTION. ♂. Fastigium of vertex sloping to frons, sulcate above.

Pronotum without lateral carinae. Fore femora with about 7–8 external spinules. Tympanic auricles of fore tibiae moderately inflated. Mid femora with about 8–12 external spinules. Fore and mid femora with dorsal ridge at apex, ending in small point or spine. Venation of fore wings as in Text-fig. 30 ; R_s unbranched.

Tenth abdominal tergite enlarged, markedly emarginate posteriorly (Text-fig. 79). Supra-anal plate rounded, flap-like. Cerci moderately robust, apex incurved and pointed. Subgenital plate as in Text-fig. 72, with rounded lobes.

General coloration green, with red-brown markings on fastigium of vertex, sides of pronotal disc and top of abdomen, and with red-brown spots on pronotal disc and abdominal tergites. Tips of cerci dark brown.

♀ unknown.

MEASUREMENTS

Male

Total length : 35·2.
Median length of pronotum : 4·9.
Length of fore wing : 28·2.

VARIATION. The two known specimens of this species do no differ from each other in any important respect.

DISCUSSION. The excised tenth abdominal tergite is found elsewhere in the genus only in the two brachypterous species *H. nomima* (Karsch) and *H. montivaga* (Sjöstedt). The hind legs were missing in both the available specimens.

MATERIAL EXAMINED

♂ holotype.

SUDAN: Gell River Post, 70 miles from Bahr-el-Gebel, 5° 54′ N., 30° 45′ E., 1923 (*Moysey*) (1 ♂) (British Museum (Natural History)).

DISTRIBUTION. *H. concava* sp. n. is quite possibly confined to southern Sudan and the extreme north-west of British East Africa.

15. ***Horatosphaga nuda*** sp. n.

Holotype ♂, SUDAN: Imatong Mtns., Kippia, 9,000 ft., 10.ii.1936 (*Johnston*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Fore wings less than 25 mm. in length, tapering to more or less acute tip; venation as in Text-fig. 31. Hind wings rudimentary. Subgenital plate as in Text-fig. 73.

♀. Venation of fore wings as in Text-fig. 90. Ovipositor as in Text-fig. 111.

DESCRIPTION. ♂. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Femora unarmed. Tympanic auricles of fore tibiae hardly inflated. Fore and mid femora with slight dorsal ridge at apex, not ending in point; hind femora without terminal dorsal spine. Hind tibiae with about 14 external dorsal spines. Fore wings tapering to more or less acute tip; venation as in Text-fig. 31.

Tenth abdominal tergite unmodified. Supra-anal plate rounded, flap-like. Cerci relatively long, moderately robust, apex sharply incurved. Subgenital plate as in Text-fig. 73.

General coloration probably green. Disc of pronotum brown.

♀. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Femora unarmed or with few very small ventral spinules. Tympanic auricles of fore tibiae not inflated; tympanic apertures slit-like. Venation of fore wings as in Text-fig. 90.

Ovipositor as in Text-fig. 111; margins crenulate in distal half.

General coloration probably green. Disc of pronotum brown. Anterior margin of fore wings whitish.

MEASUREMENTS

Males

Total length (2): 25·0–25·6, mean 25·30.
Median length of pronotum (1): 5·3.
Length of hind femur (1): 19·2.
Length of fore wing (2): 19·9–20·8, mean 20·35.

Females

Total length (5): 24·4–27·3, mean 26·24.
Median length of pronotum (4): 5·3–5·4, mean 5·32.
Length of hind femur (6): 17·6–19·7, mean 18·85.
Length of fore wing (5): 18·0–20·8, mean 19·68.
Length of ovipositor (5): 11·7–12·7, mean 12·30.

VARIATION. Some females have a few very small ventral spinules on all three pairs of femora : others have no femoral armature. The femora of the male holotype are all unarmed, but it is likely that some males have some very small femoral spinules as in the females.

DISCUSSION. The complete, or almost complete, absence of femoral armature is shared within the genus only by *H. meruensis* (Sjöstedt) ; the males of these two species also correspond in their rudimentary hind wings. The venation of the fore wings enables both sexes of the two species to be distinguished from each other.

A male specimen from Karamoja, Uganda, was found to differ from the holotype of *H. nuda* sp. n. only in having the femora armed with spines, as is usual in the genus. Other differences are extremely slight, and it seems quite possible that the two specimens are conspecific. If this is so the lack of femoral armature in the holotype may well be a subspecific character. This problem can only be settled when more material is available and the relation between the individual and geographical components of the variation can be assessed.

MATERIAL EXAMINED

♂ holotype ; 2 ♀ paratypes, same data as holotype ; 4 ♀ paratypes, SUDAN : Imatong Mtns., Kippia, 9,500 ft., ii.1936 (*Johnston*).

All in the British Museum (Natural History).

DISTRIBUTION. This species is known definitely only from the type locality. The discussion above, however, suggests that the range may include northern Uganda.

16. ***Horatosphaga meruensis*** (Sjöstedt, 1909) comb. n.

Plegmatoptera meruensis Sjöstedt, 1909, *Wiss. Ergebn. Schwed. Zool. Expdn. Kilimandjaro, Meru*, 1905–06, **17** : 130. Lectotype ♂, TANGANYIKA : Mt. Meru, Ngare na nyuki, i.1906 (*Sjöstedt*). 4 ♂ syntypes and 3 ♀ syntypes, at least one of which is from TANGANYIKA : Kilimanjaro, Kibonoto, i–iv.1906 ; those not from this locality are from locality of lectotype. Lectotype and most of syntypes in the Naturhistoriska Riksmuseum, Stockholm.

DIAGNOSIS. ♂. Fore wings less than 25 mm. in length, tapering to slender tip ; venation as in Text-fig. 32. Hind wings rudimentary. Subgenital plate as in Text-fig. 74.

♀. Venation of fore wings as in Text-fig. 91. Ovipositor as in Text-fig. 112.

MEASUREMENTS *Male*

Total length : 22·4.
Median length of pronotum : 4·3.
Length of hind femur : 20·4.
Length of fore wing : 18·9.

Females

Total length (2) : 25·1–27·2, mean 26·15.
Median length of pronotum (2) : 4·2–4·7, mean 4·45.
Length of hind femur (2) : 19·0–20·4, mean 19·70.
Length of fore wing (2) : 20·4–21·6, mean 21·00.
Length of ovipositor (2) : 9·5–9·5, mean 9·50.

Discussion. The characteristics of *H. meruensis* (Sjöstedt) and its relationship to *H. nuda* sp. n. are discussed under that species.

I have selected and marked a male lectotype from among the syntypes of this species ; this specimen already carried a red type label.

Material examined

♂ lectotype ; 2 ♀ syntypes, same data as lectotype.

Distribution. Known only from the type localities.

17. ***Horatosphaga nomima*** (Karsch, 1896) comb. n.

Peronura nomima Karsch, 1896, *Stettin ent. Ztg.* **57** : 327. 1 ♂ syntype, Tanganyika: Mpwapwa, 5.vi.1890 (*Stuhlmann*) ; 2 ♀ syntypes, Tanganyika : Mpwapwa, 7.vi.1890 (*Stuhlmann*). Both in the Zoologisches Museum of the Humboldt-Universität, Berlin.

Diagnosis. ♂. Tenth abdominal tergite emarginate posteriorly (similar to Text-fig. 80). Venation of fore wings as in Text-fig. 33. Subgenital plate as in Text-fig. 75.

♀ No material available.

Measurements

Male

Total length : 30·7.
Median length of pronotum : 5·8.
Length of hind femur : 25·2.
Length of fore wing : 24·0.

Discussion. The emarginate tenth abdominal tergite of the male of this species is found elsewhere in the genus (apart from the fully winged *H. concava* sp. n.) only in *H. montivaga* (Sjöstedt) ; it differs from the latter species in lacking the verrucose pronotal disc and the black spots on the fore wings.

A male specimen in the British Museum (Natural History) from Mroke, Tanganyika, probably belongs to this species, though being of quite considerably larger size (median length of pronotum : 7·0 ; length of hind femur : 30·0 ; length of fore wing : 25·4).

Material examined

♂ syntype.

Distribution. This species, though known for certain only from the type locality, probably occurs over a large area of Tanganyika.

18. ***Horatosphaga montivaga*** (Sjöstedt, 1909) comb. n.

Peronura montivaga Sjöstedt, 1909, *Wiss. Ergebn. Schwed. Zool. Expdn. Kilimandjaro, Meru*, 1905-06, **17** : 129. Lectotype ♂, Tanganyika : Kilimanjaro, Kibonoto, iii.1906 (*Sjöstedt*). 4 ♂ syntypes and 3 ♀ syntypes, at least one of which is from Tanganyika : Mt. Meru, xii.1905–i.1906 ; those not from this locality are from locality of lectotype. Lectotype and most of syntypes in the Naturhistoriska Riksmuseum, Stockholm.

Diagnosis. ♂. Tenth abdominal tergite emarginate posteriorly (Text-fig. 80). Fore wings with small dark spots ; venation as in Text-fig. 34. Subgenital plate as in Text-fig. 75. Pronotal disc markedly verrucose.

♀. Fore wings with small dark spots ; venation as in Text-fig. 92. Ovipositor as in Text-fig. 113. Pronotal disc markedly verrucose.

MEASUREMENTS

Male

Total length : 27·4.
Median length of pronotum : 6·0.
Length of hind femur : 29·0.
Length of fore wing : 20·5.

Female

Total length : 29·5.
Median length of pronotum : 6·3.
Length of hind femur : 24·9.
Length of fore wing : 23·4.
Length of ovipositor : 13·9.

DISCUSSION. The verrucose pronotal disc is unique in the genus.

H. montivaga (Sjöstedt) may possibly be a subspecies of *H. nomima* (Karsch), which it closely resembles in every feature of taxonomic importance except the verrucose pronotal disc and spotted fore wings. It is, however, quite impossible to settle this matter with the material at present available.

I have selected and marked a male lectotype from among the syntypes of this species ; this specimen already carried a red type label.

MATERIAL EXAMINED

♂ lectotype ; 1 ♀ syntype, TANGANYIKA : Kilimanjaro, Kibonoto, 1,000–1,200 m., 22.iv.1906 (Sjöstedt).

DISTRIBUTION. Known only from the type localities.

19. ***Horatosphaga elgonis*** (Chopard, 1938) comb. n.

Peronura elgonis Chopard, 1938, *Mém. Mus. Hist. nat., Paris*, **8** : 119. Holotype ♂, KENYA : Mt. Elgon, Elgon Saw Mill, 2,470 m., 1932–33 (*Mission Scientifique de l'Omo*). In the Muséum National d'Histoire Naturelle, Paris.

DIAGNOSIS. ♂. Tenth abdominal tergite much enlarged, forming hood over supra-anal plate (Text-fig. 53). Subgenital plate large and robust, as in Text-fig. 53. Fore wings less than 20 mm. in length, not reaching hind knees ; venation as in Text-fig. 35. Hind wings rudimentary.

♀. Hind femora less than 21 mm. in length. Venation of fore wings as in Text-fig. 93. Ovipositor as in Text-fig. 114.

MEASUREMENTS

Males

Total length (5) : 17·9–24·4, mean 20·76.
Median length of pronotum (5) : 3·9–4·1, mean 3·96.
Length of hind femur (5) : 17·4–20·2, mean 18·70.
Length of fore wing (5) : 14·0–19·3, mean 16·00.

Females

Total length (4) : 22·5–25·2, mean 23·92.
Median length of pronotum (4) : 4·2–5·1, mean 4·61.
Length of hind femur (4) : 16·9–19·8, mean 18·25.
Length of fore wing (4) : 17·0–19·0, mean 17·92.
Length of ovipositor (4) : 6·2–6·9, mean 6·60.

Discussion. The tenth abdominal tergite of the male is unique in the genus, being much enlarged but not forming the knob-like structure shown by *H. ruspolii* (Schulthess), *H. diminuta* (Chopard), and *H. vicina* (Chopard). The only other species of *Horatosphaga* Schaum which have an enlarged tenth abdominal tergite are *H. inclusa* (Karsch) and *H. crosskeyi* sp. n., which are West African and have well-developed hind wings in the male. Females of *H. elgonis* (Chopard) may be recognized by their small size and short ovipositor.

This species is a rather aberrant member of the genus, but the basal structure of the male fore wings shows (though in a state of advanced reduction) unmistakable signs of the modifications of areas MA and Cu_{1a} which are characteristic of *Horatosphaga* Schaum.

Material examined

♂ holotype ; 1 ♀ paratype, Kenya : Mt. Elgon, heath zone, 3,500 m., 1932–33 (*Mission Scientifique de l'Omo*) (same depository as holotype).

Kenya : Mt. Elgon, heath zone, 10,500–11,500 ft., ii.1935 (*Edwards*) (1 ♂) ; Aberdare Range, Mt. Kinangop, 9,000 ft., 25.x.1934 (*Edwards*) (1 ♂) ; Uganda : Mt. Elgon (——) (1 ♀) ; Butandiga, 11.i.1930 (*Hargreaves*) (1 ♂, 1 ♀) ; Kidongole, 3.xii.1910 (*Gowdey*) (1 ♀) ; N. W. Monjeri (?), 6,000–7,000 ft., 23–27.xii.1926 (*Hancock*) (1 ♂).

Distribution. It is clear from the data given above that *H. elgonis* (Chopard) is a mountain species. Its known distribution is confined to the Aberdare Range and the vicinity of Mt. Elgon.

20. ***Horatosphaga ruspolii*** (Schulthess, 1898) comb. n.

Conchotopoda ruspolii Schulthess, 1898, *Ann. Mus. Stor. nat. Genova*, **39** : 204. Holotype ♂, Kenya : Balessa, 10.x.1893 (*Ruspoli*). In the Museo Civico di Storia Naturale, Genoa.

? *Peronura rivae* Schulthess, 1898, *Ann. Mus. Stor. nat. Genova*, **39** : 201. Holotype ♀, Ethiopia : Dolo, v.1893 (*Ruspoli*). In the Museo Civico di Storia Naturale, Genoa. (See below.)

Horatosphaga trochlearis Bolivar, 1922, *Voy. M. Rothschild E. Afr. Anim. Art.* **1** : 199. Holotype ♂, Kenya : south of Lake Rudolph, 1905 (*Rothschild*). In the Muséum National d'Histoire Naturelle, Paris. ***Syn. n.***

?*Peronura viridis* Chopard, 1954, *Trans. R. ent. Soc. Lond.* **105** : 318. Holotype ♀, Kenya : Isiolo distr., Bambota, 00° 20′ N., 38° 20′ E., desert scrub, 6.vi.1946 (*Kevan*). In the British Museum (Natural History). (See below.)

Peronura samburu Kevan, 1954, *Trans R. ent. Soc. Lond.* **105** : 320. Holotype ♂, Kenya : Samburu, Barsalinga Drift, xi.1946 (*Hamilton*). In the British Museum (Natural History). ***Syn. n.***

Diagnosis. ♂. Tenth abdominal tergite greatly enlarged and completely concealing supra-anal plate, as in Text-figs. 45–50. Subgenital plate large and robust, as in Text-fig. 76. Venation of fore wings as in Text-fig. 36.

♀ unknown (but see below).

Measurements

Males

Total length (10) : 37·7–44·7, mean 39·96.
Median length of pronotum (9) : 4·7–5·7, mean 5·06.
Length of hind femur (5) : 24·7–28·4, mean 26·34.
Length of fore wing (10) : 29·4–35·2, mean 31·11.

? *Females* (see below)

Total length (2) : 25·0–26·6, mean 25·80.
Median length of pronotum (1) : 5·9.
Length of hind femur (1) : 29·3.
Length of fore wing (2) : 17·9–19·0, mean 18·45.
Length of ovipositor (2) : 9·8–10·3, mean 10·05.

Discussion. The males of this species may be recognized by the genitalia and fully developed wings. The only other species of *Horatosphaga* Schaum with this type of male genitalia are *H. diminuta* (Chopard) and *H. vicina* (Chopard), which have reduced fore wings and rudimentary hind wings.

The shape of the male tenth abdominal tergite of this species varies enormously. The series illustrated in Text-figs. 45–50 shows the gradually increasing development of the lateral lobe at the expense of the distal lobe. The extremes, Text-figs. 45 and 50, might well be regarded as distinct species in the absence of the four intermediate forms. The holotype of *Peronura samburu* Kevan agrees almost exactly with that of *H. trochlearis* Bolivar (Text-fig. 46) in the shape of this structure. The holotype of *H. ruspolii* (Schulthess) is intermediate in this respect between Text-figs. 45 and 46. A photograph, drawings, and a description of the latter specimen were kindly provided by Dr. F. Capra, of the Museo Civico di Storia Naturale, Genoa, and there is no doubt that these three holotypes are conspecific.

Although the female of *H. ruspolii* (Schulthess) is not yet known for certain, it is very probable that a female specimen (Text-figs. 94 and 115) bearing very similar data to the male from El Carre (collected the day before only a few miles away, and with similar coloration) belongs to this species. A further female bearing the same data as a male from Damassa, except for date, is probably also of this species. These females (which are very similar to females of *H. diminuta* (Chopard)) correspond closely with the female holotype of *Peronura rivae* Schulthess, a photograph and description of which were kindly supplied by Dr. Capra ; a definite synonymy, however, cannot be established until more material is available. This is also true of the female holotype of *Peronura viridis* Chopard, which is very probably either the present species or *H. diminuta* (Chopard).

MATERIAL EXAMINED

♂ holotype of *H. trochlearis* Bolivar. ♀ holotype of *Peronura viridis* Chopard. ♂ holotype of *Peronura samburu* Kevan.

ETHIOPIA: Ogaden, El Carre, 05° 51′ N., 42° 06′ E., 3,000 ft., scrub, 4.vi.1947 (*Kevan*) (1 ♂); Ogaden, nr. El Mara, 05° 48′ N., 42° 07′ E., 2,000 ft., thorn-bush, 3.vi.1947 (*Kevan*) (1 ♀); SOMALIA: Damassa, 03° 09′ N., 41° 20′ E., desert grass and thorn-bush, 19.xii.1944 (*Kevan*) (2 ♂); Damassa, 03° 09′ N., 41° 20′ E., desert grass and thorn-bush, 24.v.1947 (*Kevan*) (1 ♀); KENYA: Wajir, desert grass and thorn-bush, 7.i.1945 (*Kevan*) (1 ♂); Garissa distr., Lak Telangor, 00° 30′ N., 39° 18′ E., desert grass and thorn-bush, 26.i.1944 (*Kevan*) (1 ♂); UGANDA: Turkana, 1934 (*Buxton*) (4 ♂).

All in the British Museum (Natural History).

DISTRIBUTION. The known range of this species is confined to an area of steppe and semi-desert associated with the northern border of Kenya.

21. *Horatosphaga diminuta* (Chopard, 1954) comb. n.

Peronura diminuta Chopard, 1954, *Trans. R. ent. Soc. Lond.* **105**: 319. Holotype ♂, KENYA: Moyale, open bush, 15.vi.1946 (*Kevan*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Tenth abdominal tergite greatly enlarged and completely concealing supra-anal plate, as in Text-figs. 51 and 52. Subgenital plate large and robust, as in Text-fig. 77. Fore wings not reaching hind knees, usually less than 25 mm. in length; venation as in Text-fig. 37. Hind wings greatly reduced or rudimentary.

♀. Venation of fore wings as in Text-fig. 95. Ovipositor as in Text-fig. 116, less than 12 mm. in length.

MEASUREMENTS

Males

Total length (10): 26·3–32·0, mean 30·14.
Median length of pronotum (14): 4·7–6·1, mean 5·55.
Length of hind femur (15): 22·7–28·2, mean 25·59.
Length of fore wing (13): 18·9–25·7, mean 22·92.

Females

Total length (10): 20·5–26·1, mean 23·00.
Median length of pronotum (11): 5·6–6·6, mean 6·03.
Length of hind femur (8): 23·4–27·8, mean 25·29.
Length of fore wing (11): 13·3–17·8, mean 15·19.
Length of ovipositor (10): 9·8–10·8, mean 10·39.

DISCUSSION. In the nature of the male genitalia this species is approached only by *H. vicina* (Chopard) and *H. ruspolii* (Schulthess). The latter species, however, is fully winged, and *H. vicina* (Chopard) is much larger. The similarity between *H. vicina* (Chopard) and *H. ruspolii* (Schulthess) is so close that it is quite possible that they represent brachypterous and macropterous forms of the same species.

MATERIAL EXAMINED

♂ holotype ; 1 ♀ paratype, same data and depository as holotype.

KENYA : Moyale, open bush, 15.vi.1946 (*Kevan*) (5 ♂, 2 ♀) ; Moyale, cultivation, 8–10.vi.1947 (*Kevan*) (7 ♂, 3 ♀) ; Moyale distr., Yasere, 03° 30′ N., 38° 35′ E., thorn-bush, 14.vi.1946 (*Kevan*) (2 ♀) ; Moyale, 1954 (*Clifford*) (1 ♂, 1 ♀) ; Marsabit, vi.1934 (*L.R.R.V.E.*) (4 ♂, 1 ♀).

All in the British Museum (Natural History).

DISTRIBUTION. This species is known only from a very small area of Kenya, on or near the northern border.

22. ***Horatosphaga vicina*** (Chopard, 1954) comb. n.

Peronura vicina Chopard, 1954, *Trans. R. ent. Soc. Lond.* **105** : 318. Holotype ♀, KENYA : Marsabit, Chopa Gof, 02° 25′ N., 38° 03′ E., scrubby bushes, 13.vi.1946 (*Kevan*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Tenth abdominal tergite greatly enlarged and completely concealing supra-anal plate, similar to Text-figs. 51 and 52. Subgenital plate large and robust, as in Text-fig. 78. Fore wings not reaching hind knees, but usually more than 25 mm. in length ; venation as in Text-fig. 38. Hind wings greatly reduced or rudimentary.

♀. Venation of fore wings as in Text-fig. 96. Ovipositor as in Text-fig. 117, more than 12 mm. in length.

MEASUREMENTS

Males

Total length (3) : 32·0–35·2, mean 33·50.
Median length of pronotum (3) : 6·9–7·1, mean 7·02.
Length of hind femur (3) : 29·2–31·4, mean 29·97.
Length of fore wing (3) : 25·0–26·9, mean 25·97.

Females

Total length (2) : 23·5–27·0, mean 25·25.
Median length of pronotum (2) : 7·2–7·4, mean 7·30.
Length of hind femur (1) : 25·4.
Length of fore wing (2) : 14·8–17·0, mean 15·90.
Length of ovipositor (1) : 13·3.

DISCUSSION. This species differs from *H. diminuta* (Chopard) only in being considerably larger. The general high degree of variability in the genus suggests the possibility that *H. vicina* (Chopard) is a large form of *H. diminuta* (Chopard). However, no intermediate specimens are so far known and it is impossible to draw definite conclusions at present. (For a possible synonymy of *H. vicina* (Chopard) with *Peronura hildebrandtiana* Karsch see p. 320.)

MATERIAL EXAMINED

♀ holotype ; 1 ♂ paratype, same data and depository as holotype.

KENYA : Marsabit, Chopa Gof, 02° 25′ N., 38° 03′ E., scrubby bushes, 13.vi.1946 (*Kevan*) (3 ♂, 1 ♀).

All in the British Museum (Natural History).

DISTRIBUTION. Known only from the type locality.

23. *Horatosphaga inclusa* (Karsch, 1893) comb. n.

Pachypyga inclusa Karsch, 1893, *Berl. ent. Z.* **38** : 125. One ♂ syntype and 5 ♀ syntypes, FRENCH WEST AFRICA : Bismarckburg, xi–xii.1890 (*Büttner*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

DIAGNOSIS. ♂. Tenth abdominal tergite greatly enlarged and completely concealing supra-anal plate, as in Text-fig. 54. Cerci swollen in basal half. Subgenital plate large and robust, as in Text-fig. 54. Fore wings not reaching hind knees, usually less than 26 mm. in length ; venation as in Text-fig. 39.

♀. Fore wings less than 25 mm. in length ; venation as in Text-fig. 97. Ovipositor more than 10 mm. in length, shaped as in Text-fig. 118.

MEASUREMENTS

Males

Total length (2) : 29·3–33·2, mean 31·25.
Median length of pronotum (2) : 4·8–5·4, mean 5·10.
Length of hind femur (1) : 26·9.
Length of fore wing (2) : 22·4–26·1, mean 24·25.

Females

Total length (4) : 30·0–32·1, mean 31·00.
Median length of pronotum (4) : 5·7–6·3, mean 6·00.
Length of hind femur (4) : 26·7–29·0, mean 27·88.
Length of fore wing (4) : 21·6–24·6, mean 23·52.
Length of ovipositor (4) : 12·6–14·0, mean 13·38.

DISCUSSION. The nature of the male genitalia of this species is approached only by that of *H. crosskeyi* sp. n., in which, however, the tenth abdominal tergite is bilobed and the fore wings are more than 25 mm. in length. Females of *H. inclusa* (Karsch) may be distinguished from those of *H. crosskeyi* sp. n. by the much larger ovipositor.

MATERIAL EXAMINED

1 ♀ syntype.

FRENCH WEST AFRICA : Bismarckburg, i.1891 (*Büttner*) (1 ♀) (Nat. Mus. Vienna) ; GHANA : Northern Territories, Sarkwalla, 4–7.xi.1915 (*Simpson*) (2 ♂, 2 ♀) (British Museum (Natural History)).

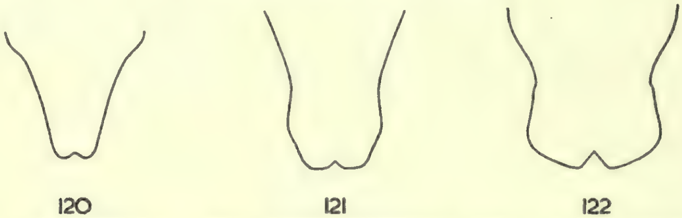
DISTRIBUTION. Though known only from the localities mentioned above, it is probable that *H. inclusa* (Karsch) also occurs over a large area to the west of Ghana. To the east it is apparently replaced by *H. crosskeyi* sp. n.

24. ***Horatosphaga crosskeyi*** sp. n.

Holotype ♂, NIGERIA : Niger Province, Diko, 8 miles north of Abuja, iv.1956 (*Crosskey*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Tenth abdominal tergite greatly enlarged and completely concealing supra-anal plate, as in Text-figs. 120–122. Cerci moderately swollen in basal half. Subgenital plate large and robust, as in Text-fig. 55. Fore wings usually reaching hind knees, more than 25 mm. in length ; venation as in Text-fig 40.

♀. Fore wings more than 25 mm. in length ; venation as in Text-fig. 98. Ovipositor less than 10 mm. in length, shaped as in Text-fig. 119.



FIGS. 120–122. Dorsal view of the male tenth abdominal tergite of *Horatosphaga crosskeyi* sp. n. from (120) Song, Adamawa Province ; (121) Diko, Niger Province ; (122) Azare, Azare Province.

DESCRIPTION. ♂. Fastigium of vertex sloping to frons, sulcate above.

Pronotum without lateral carinae. Fore femora with about 7–13 external spinules. Tympanic auricles of fore tibiae hardly inflated. Mid femora with about 9–13 external spinules. Fore and mid femora with dorsal ridge at apex, ending in point. Hind femora with about 9–12 external spinules ; terminal dorsal spine absent. Hind tibiae with about 25–40 external dorsal spines. Venation of fore wings as in Text-fig. 40.

Tenth abdominal tergite greatly enlarged and completely concealing supra-anal plate, as in Text-figs. 120–122. Cerci moderately swollen in basal half, apex curved inwards. Subgenital plate large and robust, of variable form, as in Text-fig. 55.

General coloration green. Antennae, disc of pronotum, stridulatory organ, hind margin of fore wings, and top of abdomen, usually red-brown.

♀. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Armature of legs as in male. Tympanic auricles of fore tibiae not inflated ; tympanic aperture slit-like. Venation of fore wings as in Text-fig. 98.

Ovipositor as in Text-fig. 119, margins crenulate in distal half.

General coloration green.

MEASUREMENTS

Males

Total length (20) : 33·4–41·8, mean 36·92.
Median length of pronotum (20) : 4·8–5·8, mean 5·18.
Length of hind femur (20) : 22·6–28·4, mean 25·09.
Length of fore wing (20) : 26·7–32·8, mean 28·94.

Female

Total length : 35·9.
Median length of pronotum : 5·4.
Length of hind femur : 24·5.
Length of fore wing : 27·5.
Length of ovipositor : 8·8.

VARIATION. There is variation in the armature of the legs. The venation of the fore wings varies somewhat, R_s occasionally being unbranched. The tenth abdominal tergite shows enormous variation in shape (cf. Text-figs. 120–122). The intensity of the red-brown pigmentation of the males varies greatly : some specimens are almost entirely green.

DISCUSSION. The shape of the tenth abdominal tergite of the male of this species, though showing great geographical variations, is unique in the genus. Females may be distinguished from the only other West African species of *Horatosphaga* Schaum (*H. inclusa* (Karsch)) by the shorter ovipositor and longer fore wings.

In some respects *H. crosskeyi* sp. n. seems to represent the West African equivalent of *H. ruspolii* (Schulthess) : the males are similar in general appearance and wing-venation, and show a similar great variation in the shape of the tenth abdominal tergite. Also, *H. inclusa* (Karsch) is a closely related brachypterous derivative of *H. crosskeyi* sp. n. in much the same way as *H. diminuta* (Chopard) is related to *H. ruspolii* (Schulthess). Doubtless all four of these species have evolved comparatively recently from a common ancestor differing (in the male) from the more typical members of the genus in having an enlarged tenth abdominal tergite.

MATERIAL EXAMINED

♂ holotype ; 1 ♂ paratype, NIGERIA : Niger Province, Diko, nr. Abuja, at light, iv–x.1956 (*Crosskey*) ; 1 ♂ paratype, NIGERIA : Niger Province, Diko, nr. Abuja, at light, xii.1956–i.1957 (*Crosskey*) ; 1 ♂ paratype, NIGERIA : Niger Province, Minna, at light, viii.1955 (*Crosskey*) ; 1 ♂ paratype, NIGERIA : Niger Province, Minna, at light, vi.1955 (*Crosskey*) ; 2 ♂ paratypes, NIGERIA : Niger Province, Minna, xi.1954 (*Crosskey*) ; 1 ♂ paratype, NIGERIA : Niger Province, Minna, at light, vii.1955 (*Crosskey*) ; 5 ♂ paratypes, NIGERIA : Adamawa Province, Song, 45 miles north of Yola, vii.1958 (*Crosskey*) ; 3 ♂ paratypes, NIGERIA : Kabba Province, Lokoja, v.1958 (*Crosskey*) ; 1 ♀ paratype, NIGERIA : Niger Province, Abuja, vi.1955 (*Crosskey*).

NIGERIA : Azare, x.1928 (*Lloyd*) (4 ♂).

All in the British Museum (Natural History).

DISTRIBUTION. This species is known only from Nigeria, where it is widely distributed in the Northern Provinces.

PERONURA Karsch, 1888

Peronura Karsch, 1888, *Berl. ent. Z.* **32** : 426. Type species, by subsequent selection (Kirby, 1906, p. 391), *Peronura clavigera* Karsch, 1888.

DIAGNOSIS. ♂. Fore wings reduced to small lobes less than twice length of pronotum ; area MA somewhat concave basally. Fastigium of frons reaching almost to top of antennal scrobes. Tympanic auricles of fore tibiae not inflated.

♀. No known diagnostic character (but see remarks below).

DESCRIPTION. ♂. Fastigium of frons reaching almost to top of antennal scrobes. Fastigium of vertex compressed, sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Fore coxae without spine. Tympanic auricles of fore tibiae not inflated. Fore wings reduced to small lobes less than twice length of pronotum ; area MA somewhat concave basally. Hind wings rudimentary.

♀. As male except for area MA of fore wings, which is unmodified.

DISCUSSION. The very reduced fore wings of this monotypic genus provide the only non-sexual character to distinguish it from *Horatosphaga* Schaum. The male cerci, however, are markedly different, taking the long, acuminate form shown in Text-fig. 123 ; the female, moreover, has a pair of tubercles at the base of the ovipositor, protruding from an enlarged eighth abdominal tergite. Although these genitalic characters are striking, they may prove to be of importance at the specific level only, and are not therefore put forward as generic characters here. In the males the lateral pronotal lobes differ in shape from that typical of *Horatosphaga* Schaum in having no backward prolongation, but some of the brachypterous species of that genus tend to be intermediate in this respect. Ignoring sexual characters *Peronura* Karsch closely resembles some of the brachypterous species of *Horatosphaga* Schaum, and it would perhaps have been unwise to give it separate status if that genus had not already been in an uncomfortably cumbersome state. As things stand, however, it is advisable to regard *Peronura* Karsch as a distinct, though poorly defined, genus within the Acrometopae.

The species *P. hildebrandtiana* Karsch was included by this author as a second species of *Peronura* Karsch in his original description of the genus. The status of this species, still known only by the unique female holotype, must remain in doubt until males are available. *P. hildebrandtiana* Karsch does not have the tubercles at the base of the ovipositor which characterize *P. clavigera* Karsch, nor does it show the enlargement of the eighth abdominal tergite : its appearance in fact seems more suggestive of its belonging to *Horatosphaga* Schaum. There is a pronounced point at the tip of the hind femora of the type shown by many species of *Horatosphaga* Schaum and the fore wings, though reduced, are more than twice the length of the pronotum. It is quite possible that *P. hildebrandtiana* Karsch is the same species as *H. vicina* (Chopard) (p. 316), from which it differs only by the terminal spine on the hind femur (which is known to undergo marked geographical variation in the Acrometopae) and the shape of the subgenital plate (more significant but difficult to appreciate as the subgenital plate of the holotype of *P. hildebrandtiana* Karsch has been opened out—presumably in an attempt on the part of the original author to find the tubercles which characterize *P. clavigera* Karsch). Clearly, the status of this species cannot be clarified until more material is available. The data and measurements of the holotype are given below.

Peronura hildebrandtiana Karsch, 1888, *Berl. ent. Z.* **32** : 427. Holotype ♀, KENYA : Mombasa, xii.1876 (*Hildebrandt*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

Measurements of holotype.
Total length : 27·2.
Median length of pronotum : 7·4.
Length of hind femur : 28·6.
Length of fore wing : 17·7.
Length of ovipositor : 14·2.

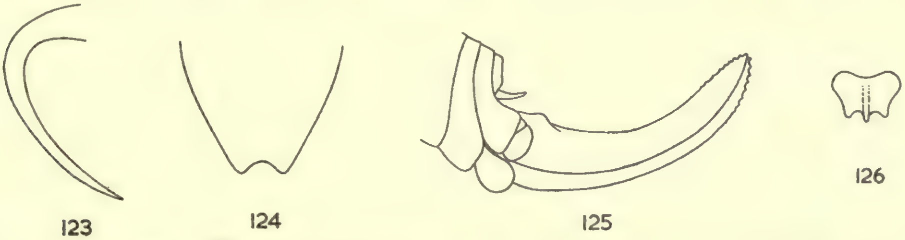
DISTRIBUTION (Text-fig. 44). *Peronura* Karsch (in the restricted sense used here) has so far not been found outside Kenya, where it appears to show a preference for the drier parts. It does not apparently extend into the driest north-eastern part of the country.

Peronura clavigera Karsch, 1888

Peronura clavigera Karsch, 1888, *Berl. ent. Z.* **32** : 427. Two ♀ syntypes, KENYA : Mombasa xii.1876 (*Hildebrandt*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

DIAGNOSIS. ♂. Cerci long and acuminate, as in Text-fig. 123. Subgenital plate as in Text-fig. 124.

♀. Ovipositor with pair of large tubercles at base, protruding from enlarged eighth abdominal tergite, as in Text-fig. 125. Subgenital plate as in Text-fig. 126.



FIGS. 123–126. *Peronura clavigera* Karsch. (123). Dorsal view of the left male cercus. (124) Ventral view of the male subgenital plate. (125) Lateral view of the ovipositor and associated structures. (126) Ventral view of the female subgenital plate.

MEASUREMENTS

Males

Total length (4) (see remarks on p. 274) : 17·7–23·4, mean 19·88.
Median length of pronotum (4) : 5·0–5·7, mean 5·25.
Length of hind femur (3) : 20·2–25·5, mean 22·27.
Length of fore wing (4) : 4·8–5·2, mean 4·97.

MEASUREMENTS—(*cont.*)

Females

Total length (12) (see remarks on p. 274) : 20·0–26·8, mean 23·06.
Median length of pronotum (12) : 5·1–6·3, mean 5·71.
Length of hind femur (10) : 20·3–24·7, mean 22·29.
Length of fore wing (11) : 4·2–6·5, mean 4·96.
Length of ovipositor (12) : 10·0–13·0, mean 11·85.

DISCUSSION. As mentioned when discussing the genus, the genitalia of both sexes of this species are very characteristic. The tubercles at the base of the ovipositor (which are rarely absent, possibly through damage) are in fact probably unique in the Tettigoniidae ; their function is quite unknown.

MATERIAL EXAMINED

One ♀ syntype.

KENYA : Lake Baringo, east, (*Ford*) (1 ♂) ; Samburu distr., vi.1944 (*Opiko*) (1 ♂, 2 ♀) ; Chyulu Hills, 5,200–5,600 ft. (*Coryndon Museum Exp.*) (2 ♂, 5 ♀) ; Nairobi, vi.1928 (*van Someren*) (1 ♀) ; Sultan Hamud to Makindu, 20–21.i.1954 (*Waloff*) (1 ♀) ; Mambre Estate, 26.v.1932 (*Lewis*) (1 ♀) ; N. Kamaba distr. (*Dundas*) (1 ♀).

All in the British Museum (Natural History).

DISTRIBUTION. As given for the genus.

PROSPHAGA gen. n.

Type species : *Pantolepta calaharica* Karny, 1910.

DIAGNOSIS. ♂. Antennal scrobes reaching above fastigium of frons, as in Text-fig. 133. Branches of R_s of fore wings ending slightly behind, not actually at, wing-tip (Text-figs. 41 and 42). Pronotum selliform. Cross-veins of fore wings arranged irregularly ; areas MA and Cu_{1a} tending to develop basal concavities as in *Horatosphaga* Schaum, but condition is not as advanced as in that genus. Tympanic auricles of fore tibiae not inflated.

♀. Antennal scrobes and tympanic auricles as in male.

DESCRIPTION. ♂. Antennal scrobes reaching above fastigium of frons, as in Text-fig. 133. Fastigium of vertex compressed, sloping steeply to frons, sulcate above.

Pronotum selliform, without lateral carinae. Fore coxae without spine. Tympanic auricles of fore tibiae not inflated. Cross-veins of fore wings arranged irregularly ; areas MA and Cu_{1a} tending to develop basal concavities as in *Horatosphaga* Schaum, but condition is not as advanced as in that genus. Branches of R_s of fore wings ending slightly behind, not actually at, wing-tip (Text-figs. 41 and 42).

Subgenital plate flattened and upcurved.

♀. As male except for wings and genitalia. Hind wings rudimentary.

DISCUSSION. The venation at the base of the male fore wings shows that this genus is closely related to *Conchotopoda* Karsch and *Horatosphaga* Schaum ; indeed, in *P. splendens* sp. n. area Cu_{1a} shows the typical form of *Horatosphaga* Schaum, though the base of area MA has not developed completely the concavity shown by that genus. Males of *Prosphaga* gen. n. (Text-fig. 127) differ from those of *Horatosphaga* Schaum in lacking the web-like arrangement of the cross-veins, and the more prominent antennal scrobes of the former genus enable both sexes of the two genera to be distinguished. The basal pocket shown by the right male fore wing of *Conchotopoda* Karsch is not developed in *Prosphaga* gen. n. (For additional remarks concerning *Prosphaga* gen. n. see p. 273.)

DISTRIBUTION (Text-fig. 44). This genus is so far known only from Ethiopia and the eastern side of the Kalahari Desert. Both these regions have a considerably drier climate than the intervening area of central Africa, and it is very likely that *Prosphaga* gen. n. has a discontinuous distribution.

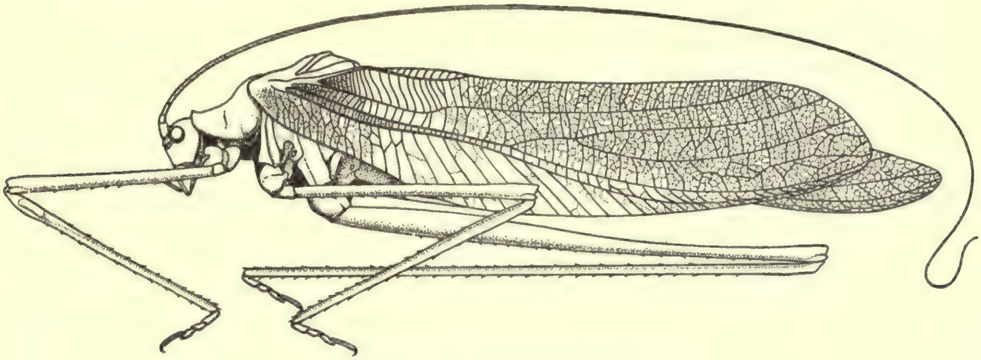


FIG. 127. *Prosphaga splendens* gen. et sp. n., male.

KEY TO THE SPECIES

As the female sex of one of the two species of this genus is unknown, this key is based on males only. The difference in the apex of the hind femora, however, doubtless applies to both sexes.

1. Hind femora ending in a dorsal point. Total length less than 55 mm. (South Africa) . . . . *P. calaharica* (Karny) (p. 323)
–. Hind femora without a terminal dorsal point. Total length more than 55 mm. (Ethiopia) . . . . *P. splendens* sp. n. (p. 324)

1. ***Prosphaga calaharica*** (Karny, 1910) comb. n.

Pantolepta calaharica Karny, 1910, *Denkschr. med.-naturw. Ges. Jena*, **16**: 52. Holotype ♂, SOUTH AFRICA: Bechuanaland, Kalahari, Ku Gudie, nr. Pitsani, i.1905 (*Schultze*). In the Zoologisches Museum of the Humboldt-Universität, Berlin.

DIAGNOSIS. ♂. Hind femora ending in dorsal point. Tenth abdominal tergite produced somewhat posteriorly, as in Text-fig. 128, forming broad hood over most of supra-anal plate. Subgenital plate as in Text-fig. 129.

♀. Hind femora ending in dorsal point. Ovipositor as in Text-fig. 130. Venation of fore wings as in Text-fig. 131.

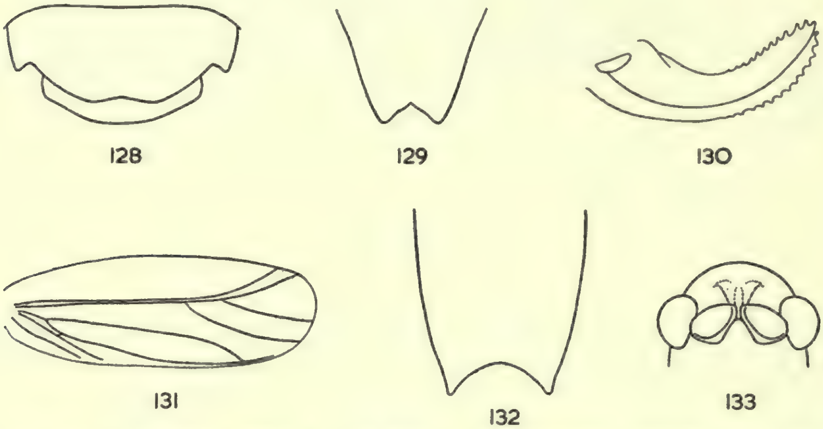
MEASUREMENTS

Males

Total length (3) : 37·3–52·3, mean 46·43.
Median length of pronotum (3) : 5·2–5·8, mean 5·50.
Length of hind femur (2) : 33·3–33·6, mean 33·45.
Length of fore wing (3) : 36·0–40·1, mean 38·10.

Female

Total length : 31·0.
Median length of pronotum : 6·32.
Length of hind femur : 34·3.
Length of fore wing : 25·3.
Length of ovipositor : 10·4.



FIGS. 128–133. *Prosphaga* gen. n. 128–131. *P. calaharica* (Karny), (128) dorsal view of the male tenth abdominal tergite and supra-anal plate, (129) ventral view of the male subgenital plate, (130) lateral view of the ovipositor, and (131) right female fore wing. 132–133. *P. splendens* sp. n., (132) ventral view of the male subgenital plate, and (133) anterior view of the dorsal part of the head.

DISCUSSION. The terminal point of the hind femora enables this species to be easily distinguished from *P. splendens* sp. n.

MATERIAL EXAMINED

♂ holotype.

SOUTH AFRICA : Transvaal, junction of Crocodile and Marico rivers, ii.1918 (Tucker) (2 ♂, 1 ♀) (S. A. Mus.).

DISTRIBUTION. Known only from the eastern side of the Kalahari Desert.

2. ***Prosphaga splendens*** sp. n.

Holotype ♂, ETHIOPIA : Wardere, 7–9.xi.1952 (*Stephenson*). In the British Museum (Natural History).

Diagnosis. ♂. Hind femora without terminal dorsal point. Tenth abdominal tergite somewhat enlarged, otherwise unmodified. Subgenital plate as in Text-fig. 132.

♀ unknown.

Description. ♂. Fastigium of vertex sloping steeply to frons, sulcate above. Pronotum without lateral carinae. Fore femora with about 5–8 external spinules. Mid femora with about 10–12 external spinules. Fore and mid femora with dorsal ridge at apex, not ending in point. Hind femora with about 14–21 external spinules; terminal dorsal spine absent. Hind tibiae with about 30–35 external dorsal spines. Venation of fore wings as in Text-fig. 42.

Tenth abdominal tergite somewhat enlarged. Supra-anal plate rounded, flap-like. Cerci robust, apex incurved and pointed. Subgenital plate as in Text-fig. 132.

General coloration green. Top of head, disc of pronotum, stridulatory organ, hind edge of fore wings, and parts of legs, dark brown. Top of abdomen black. Base of costal area of fore wings whitish.

♀ unknown.

Measurements

Males

Total length (8) : 61·4–70·0, mean 66·60.
Median length of pronotum (7) : 7·7–8·5, mean 8·20.
Length of hind femur (8) : 39·6–44·8, mean 42·28.
Length of fore wing (7) : 46·9–55·0, mean 52·00.

Variation. The armature of the legs is somewhat variable. There is a certain amount of variation in colouring, especially in the extent of the brown colour.

Discussion. This species is separated geographically from the only other known species of the genus, *P. calaharica* (Karny), by most of tropical Africa; it may be distinguished from it by the lack of the terminal dorsal point on the hind femora.

Material examined

♂ holotype; 2 ♂ paratypes, Ethiopia: Wardere, 24.xi.1953 (*Popov*); 2 ♂ paratypes, Ethiopia: Wardere, 29.xi.1953 (*Popov*); 3 ♂ paratypes, Ethiopia: Ual Ual, 19.xi.1953 (*Bellehu*).

All in the British Museum (Natural History).

Distribution. Known only from eastern Ethiopia.

CONCHOTOPODA Karsch, 1887

Conchotopoda Karsch, 1887, *Ent. Nachr.* **13**: 44. Type species, by monotypy, *Conchotopoda belcki* Karsch, 1887.

Rhegmatopoda Brunner, 1891, Additamenta zur Monographie der Phaneropteriden, p. 44. Type species, by monotypy, *Horatosphaga leptocerca* Stal, 1876. ***Syn. n.***

Diagnosis. ♂. Basal region of M or right fore wing developed into posterior fold, forming pocket next to stridulatory organ (Text-fig. 4). Branches of R_s of fore wings ending on posterior wing-margin, rather than at wing-tip. Antennal scrobes reaching same level as, or slightly above, fastigium of frons, which often has acute tip. Cross-veins of fore wings arranged irregularly; areas MA and Cu_1 tending to develop basal concavities as in *Horatosphaga* Schaum, but condition is not as advanced as in that genus. Tympanic auricles of fore tibiae not inflated or only slightly so.

♀. No known diagnostic character.

DESCRIPTION. ♂. Antennal scrobes reaching same level as, or slightly above, fastigium of frons, which often has acute tip. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae, not as markedly selliform as in *Prosphaga* gen. n. Fore coxae without spine. Tympanic auricles of fore tibiae not inflated or only slightly so. Cross-veins of fore wings arranged irregularly; areas MA and Cu_{1a} tending to develop basal concavities as in *Horatosphaga* Schaum, but condition is not as advanced as in that genus; basal region of M of right fore wing developed into posterior fold, forming pocket next to stridulatory organ. Branches of R_s of fore wings ending on posterior wing-margin, rather than at wing-tip.

Subgenital plate not as markedly upcurved as in *Prosphaga* gen. n.

♀. As male except for fore wings and genitalia. Hind wings rudimentary.

DISCUSSION. Males of this genus are characterized by the basal pocket of the right fore wing, which is doubtless concerned physiologically with stridulation. The pronotum is much less markedly selliform than in *Prosphaga* gen. n. As in the latter genus the venation of the base of the male fore wings shows a relationship to *Horatosphaga* Schaum, but the base of area MA has not developed completely the concavities shown by *Horatosphaga* Schaum.

The female of this genus is known in one species only, *C. crassicauda* sp. n. It apparently shows no characters of diagnostic importance at the generic level.

The type species of this genus is clearly congeneric with *Horatosphaga leptocerca* Stal, the type species of *Rhegmatopoda* Brunner; these two species both have the characteristic basal pocket on the right fore wing of the male, and differ by no character of significance at the generic level. *Rhegmatopoda* Brunner is therefore synonymized here with *Conchotopoda* Karsch.

DISTRIBUTION (Text-fig. 44). *Conchotopoda* Karsch is known only from South and South West Africa. So far none of the species has been recorded from Cape Province except *C. grallatoria* (Stal), which has "Caffraria" as its type locality.

KEY TO THE SPECIES

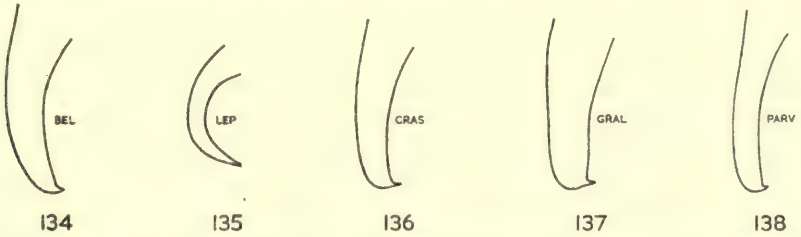
As the female sex is known in only one of the species, this key refers to males only.

1. Hind wings well-developed 2
–. Hind wings rudimentary 4
2. Fore wings more than four times longer than their maximum width, as in Text-figs. 6 and 7 3
–. Fore wings less than four times longer than their maximum width, as in Text-fig. 5 *C. belcki* Karsch (p. 327)
3. Cerci as in Text-fig. 135 . . . . *C. leptocerca* (Stal) (p. 328)
–. Cerci as in Text-fig. 136 . . . . *C. crassicauda* sp. n. (p. 328)
4. Median length of pronotum more than 5·5 mm. . . . *C. grallatoria* (Stal) (p. 330)
–. Median length of pronotum less than 5·5 mm. . . . *C. parva* sp. n. (p. 330)

1. ***Conchotopoda belcki*** Karsch, 1887

Conchotopoda belcki Karsch, 1887, *Ent. Nachr.* **13** : 44. Holotype ♂, South West Africa : Damaraland (*Belck*). Lost.

Pantolepta morsei Karny, 1910, *Denkschr. med.-naturw. Ges. Jena,* **16** : 53. One ♂ syntype, South West Africa : Windhoek (*Techow*) ; 1 ♂ syntype, South West Africa : Kung-Buschmannland (*Lübbert*). In the Zoologisches Museum of the Humboldt-Universität, Berlin. ***Syn. n.***



Figs. 134–138. Dorsal view of the left male cercus of (134) *Conchotopoda belcki* Karsch ; (135) *C. leptocerca* (Stal) ; (136) *C. crassicauda* sp. n. ; (137) *C. grallatoria* (Stal) ; (138) *C. parva* sp. n.

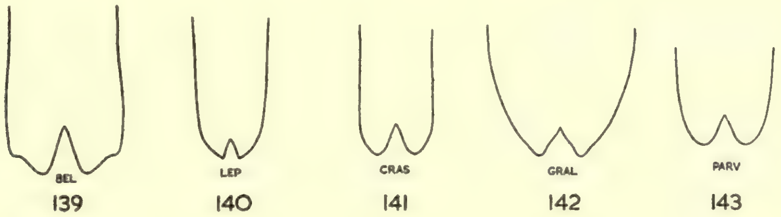
Diagnosis. ♂. Venation of fore wings as in Text-fig. 5. Subgenital plate as in Text-fig. 139.

♀ unknown.

Measurements

Males

Total length (1) : 43·6.
Median length of pronotum (3) : 5·4–6·0, mean 5·87.
Length of hind femur (3) : 29·6–32·2, mean 30·83.
Length of fore wing (3) : 30·3–34·7, mean 32·83.



Figs. 139–143. Ventral view of the male subgenital plate of (139) *Conchotopoda belcki* Karsch ; (140) *C. leptocerca* (Stal) ; (141) *C. crassicauda* sp. n. ; (142) *C. grallatoria* (Sjöstedt) ; (143) *C. parva* sp. n.

Discussion. Males of *C. belcki* Karsch may be easily distinguished from the only other two fully winged species of the genus, *C. leptocerca* (Stal) and *C. crassicauda* sp. n., by the much broader fore wings.

The holotype of *C. belcki* Karsch is lost, but the present species (to which the holotype of *Pantolepta morsei* Karny belongs) is the only species of Acrometopae known to occur in South West Africa which shows a combination of the following characters mentioned in the original description.

1. The branches of R_s end on the hind margin of the fore wing (not at the wing-tip, as in *Horatosphaga serrifera* Schaum and *H. stylifera* (Karny)).
2. R_1 is branched near the wing-tip (not unbranched, as in *H. serrifera* Schaum and *H. stylifera* (Karny)).
3. The fore wings are broader than in *Acrometopa* Fieber (those of *C. leptocerca* (Stal) being considerably narrower than in *Acrometopa* Fieber).

It would be very desirable to have a neotype for *C. belcki* Karsch, but I have no suitable specimen available at present.

MATERIAL EXAMINED

One ♂ syntype (Windhoek) of *Pantolepta morsei* Karny.

SOUTH AFRICA : Transvaal, Barberton (Edwards) (1 ♂) (S. A. Mus.) ; Transvaal, Barberton (*Rendall*) (1 ♂) (British Museum (Natural History)).

DISTRIBUTION. This species is know only from South West Africa and Transvaal, but doubtless also occurs in Bechuanaland and perhaps other parts of South Africa.

2. ***Conchotopoda leptocerca*** (Stal, 1876) comb. n.

Horatosphaga leptocerca Stal, 1876, *Förh. Kongl. Vetensk. Stockh.* **33** (3) : 59. Holotype ♂, SOUTH WEST AFRICA : Damara (*de Vylder*). In the Naturhistoriska Riksmuseum, Stockholm.

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 6. Cerci as in Text-fig. 135. Subgenital plate as in Text-fig. 140.

♀ unknown.

MEASUREMENTS

Male

Total length : 36·1.
Median length of pronotum : 4·1.
Length of hind femur : 23·9.
Length of fore wing : 28·0.

DISCUSSION. This species may be distinguished from all the other members of the genus except *C. crassicauda* sp. n. by the combination of fully developed hind wings and slender fore wings. It may be separated from *C. crassicauda* sp. n. by the shape of the male cerci and the rather broader fore wings.

MATERIAL EXAMINED

♂ holotype.

DISTRIBUTION. *C. leptocerca* (Stal) is known definitely only from the type locality.

3. ***Conchotopoda crassicauda*** sp. n.

Holotype ♂, SOUTH AFRICA : Transvaal, Pietersburg, 1904 (*Faure* (?)). In the South African Museum, Cape Town.

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 7. Cerci as in Text-fig. 136. Subgenital plate as in Text-fig. 141.

♀. Venation of fore wings as in Text-fig. 144. Ovipositor as in Text-fig. 145.

Description. ♂. Antennal scrobes reaching above fastigium of frons, which has acute tip. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Fore and mid femora without external spinules and without dorsal ridge at apex. Tympanic auricles of fore tibiae not inflated ; tympanic apertures slit-like. Hind femora sometimes with about 1–2 ventral spinules. Hind tibiae with about 27 external dorsal spines. Venation of fore wings as in Text-fig. 7.

Tenth abdominal tergite unmodified. Supra-anal plate transverse. Cerci as in Text-fig. 136. Subgenital plate as in Text-fig. 141.

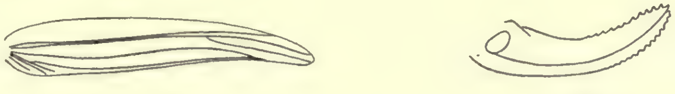
Coloration green except for brown patch on stridulatory organ and sometimes few brown markings on legs and abdomen. Pronotum sometimes with dark spots.

♀. Antennal scrobes reaching slightly above fastigium of frons, which has acute tip. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Fore femora without external spinules. Fore tibiae as in male. Mid femora with about 2–3 external spinules. Fore and mid femora without dorsal ridge at apex. Hind femora with about 4 external spinules. Hind tibiae with about 25–30 external dorsal spines. Venation of fore wings as in Text-fig. 144.

Ovipositor as in Text-fig. 145.

Coloration green.



Figs. 144 and 145. *Conchotopoda crassicauda* sp. n. (144) Right female fore wing. (145) Lateral view of the ovipositor.

Variation. The armature of the legs is variable, and it is possible that some males have external spinules on the fore and mid femora.

Measurements

Males

Total length (1) : 34·9.
Median length of pronotum (1) : 4·8.
Length of hind femur (1) : 26·6.
Length of fore wing (2) : 24·9–28·0, mean 26·45.

Female

Total length : 33·5.
Median length of pronotum : 5·2.
Length of hind femur : 22·6.
Length of fore wing : 26·4.
Length of ovipositor : 9·2.

DISCUSSION. This species is closely related to *C. leptocerca* (Stal), from which it differs in the rather narrower fore wings and in the shape of the male cerci. Males of *C. crassicauda* sp. n. may be distinguished from the remaining species of the genus by the combination of fully developed hind wings and narrow fore wings.

The female specimen bears no data but it can be regarded as being conspecific with the males. All three specimens come from the same batch of South African material, however, and it seems likely that the one species is involved.

MATERIAL EXAMINED

♂ holotype.

One ♂ and 1 ♀ without data (♂ in the British Museum (Natural History); ♀ in the South African Museum).

DISTRIBUTION. Known only from the type locality.

4. ***Conchotopoda grallatoria*** (Stal, 1856) comb. n.

Phaneroptera ? grallatoria, Stal, 1856, *Förh. Kongl. Vetensk. Stockh.* **13** : 170. Holotype ♂, SOUTH AFRICA : Caffraria (*Wahlberg*). In the Naturhistoriska Riksmuseum, Stockholm.

DIAGNOSIS. ♂. Venation of fore wings as in Text-fig. 8. Subgenital plate as in Text-fig. 142. Hind wings rudimentary.

♀ unknown.

MEASUREMENTS

Males

Total length (2) : 25·8–29·8, mean 27·80.
Median length of pronotum (2) : 6·0–6·3, mean 6·15.
Length of hind femur (1) : 29·8.
Length of fore wing (2) : 21·1–24·1, mean 22·60.

DISCUSSION. This species differs from males of *C. leptocerca* (Stal), *C. crassicauda* sp. n., and *C. belcki* (Karsch), by its lack of hind wings, and from *C. parva* sp. n. by its much larger size.

MATERIAL EXAMINED

♂ holotype.

SOUTH AFRICA : Zululand, Nagana Res. Lab., 1922 (*Curson*) (1 ♂) (British Museum (Natural History)).

DISTRIBUTION. Known only from Caffraria and Zululand.

5. ***Conchotopoda parva*** sp. n.

Holotype ♂, SOUTH AFRICA : Orange Free State, Witzieshoek, 6,100 ft., 22.ii. 1929 (*Scott*). In the British Museum (Natural History).

DIAGNOSIS. ♂. Venation of fore wings as in Text-figs. 9 and 10. Subgenital plate as in Text-fig. 143. Hind wings rudimentary.

♀ unknown.

DESCRIPTION. ♂. Antennal scrobes reaching slightly above fastigium of frons, which has acute tip. Fastigium of vertex sloping steeply to frons, sulcate above.

Pronotum without lateral carinae. Fore and mid femora without external spinules and without dorsal ridge at apex. Tympanic auricles of fore tibiae not inflated; tympanic apertures slit-like. Hind femora with a variable number of ventral spinules. Hind tibiae with about 20–25 external dorsal spines. Venation of fore wings as in Text-figs. 9 and 10. Hind wings rudimentary.

Tenth abdominal tergite unmodified. Supra-anal plate broad, rounded, flap-like. Cerci as in Text-fig. 138. Subgenital plate as in Text-fig. 143.

General coloration probably green, with dark spots on top of head, pronotum, and parts of femora.

♀ unknown.

VARIATION. The holotype of this species has about 13 ventral spinules on each hind femur, whereas in the specimen from Pretoria the hind femora are unarmed.

MEASUREMENTS

Males

Total length (1) : 24·6.
Median length of pronotum (1) : 4·9.
Length of hind femur (2) : 20·2–22·9, mean 21·55.
Length of fore wing (2) : 20·3–21·1, mean 20·70.

DISCUSSION. This species shares with *C. grallatoria* (Stal) the lack of hind wings but differs from that species in its much smaller size, narrower fore wings, and lack of armature on the fore and mid femora.

The specimen from Pretoria has quite considerably narrower fore wings than the holotype and further material may well show that this species varies geographically.

MATERIAL EXAMINED

♂ holotype.

SOUTH AFRICA : Pretoria (*Distant*) (1 ♂) (British Museum (Natural History)).

DISTRIBUTION. Known only from Witzieshoek and Pretoria.

LAMECOSOMA gen. n.

Type species : *Lamecosoma tenuis* sp. n.

DIAGNOSIS. ♂. Body very attenuate, total length about twelve times maximum width of pronotum. Lateral pronotal lobes about three times longer than their maximum depth. Fastigium of frons extending upwards slightly beyond fastigium of vertex. Tympana of fore tibiae each partially obscured by ventral operculum, which is not inflated. Hind wings rudimentary.

♀ unknown.

DESCRIPTION. ♂. Fastigium of frons extending upwards slightly beyond fastigium of vertex. Fastigium of vertex somewhat compressed, narrow, sulcate above.

Pronotum elongate, without lateral carinae, lateral lobes about three times longer than their maximum depth. Fore coxae without spine. Tympana of fore tibiae partially obscured by ventral operculum, which is not inflated. Legs attenuate, hind femora about eighteen times longer than their maximum vertical width. Hind wings rudimentary.

♀ unknown.

Discussion. This genus (see Text-fig. 3) appears to be quite closely related to *Horatosphaga* Schaum and *Peronura* Karsch. Although the venation at the base of the fore wings does not conform to the pattern typical of *Horatosphaga* Schaum, its nature does give a slight suggestion of it. The facies of the body also shows an affinity with *Horatosphaga* Schaum and a derivation from common stock seems very likely. The male cerci are of the same type as those of *Peronura* Karsch.

Although the female sex of this genus is not known for certain, a female specimen from Morogoro, Tanganyika, may well belong to *Lamecosoma* gen. n. It is very similar in general appearance to males of *L. tenuis* sp. n. and has the slightly greater size which would be expected of a female. Two more females from the Chyulu Hills, southern Kenya, may also belong to this genus. These specimens are again of similar facies, but are rather smaller and could not therefore belong to *L. tenuis* sp. n. All three of these female specimens have a relatively long, gently upcurved, ovipositor.

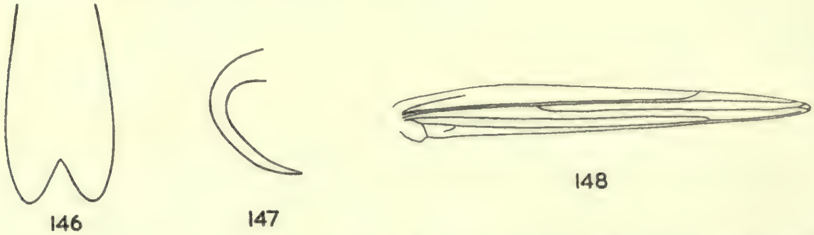
Distribution (Text-fig. 44). This genus is known only from the type locality of *L. tenuis* sp. n., but may well occur over a large part of East Africa.

Lamecosoma tenuis sp. n.

Holotype ♂, Northern Rhodesia: Kipundu, 21.i.1938 (*Brédo*). In the Musée Royal du Congo Belge, Tervuren.

Diagnosis. ♂. Subgenital plate as in Text-fig. 146. Cerci as in Text-fig. 147. Venation of fore wings as in Text-fig. 148.

♀ unknown.



Figs. 146–148. *Lamecosoma tenuis* sp. n. (146) Ventral view of the male subgenital plate. (147) Dorsal view of the left male cercus. (148) Right male fore wing.

Description. ♂. Fastigium of vertex sloping to frons, sulcate above.

Pronotum without lateral carinae. Fore femora with about 10–14 external spinules. Mid femora with about 13–20 external spinules. Fore and mid femora with dorsal ridge at apex, ending in spine or point. Hind femora with about 19–22 external spinules; terminal dorsal spine absent. Hind tibiae with about 20–35 external dorsal spines. Fore wings covered almost entirely with dense archedictyon; venation as in Text-fig. 148.

Tenth abdominal tergite emarginate posteriorly. Supra-anal plate rounded, flap-like. Cerci as in Text-fig. 147. Subgenital plate relatively large, shaped as in Text-fig. 148.

General coloration green. Top of head, part of antennae, disc of pronotum, stridulatory organ, hind edge of fore wings, and parts of legs, reddish brown.

♀ unknown.

MEASUREMENTS

Males

Total length (3) : 41·1–43·9, mean 42·77.
Median length of pronotum (2) : 6·2–6·3, mean 6·25.
Length of hind femur (3) : 29·8–30·7, mean 30·27.
Length of fore wing (3) : 33·6–37·1, mean 35·17.

DISCUSSION. In its high degree of attenuation this species resembles *Tylopsis* Fieber ; it differs, however, from this genus in lacking the fore coxal spine and in having rudimentary hind wings. Both the fore wings and the pronotum, moreover, are considerably more attenuate.

Remarks concerning a possible female of this species are given above in the discussion of the genus.

MATERIAL EXAMINED

♂ holotype ; 1 ♂ paratype, same data as holotype (British Museum (Natural History)) ; 1 ♂ paratype, NORTHERN RHODESIA : Kipundu, 19.i.1938 (*Brédo*) (Mus. Congo Belge).

DISTRIBUTION. Known only from the type locality.

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BRITISH MUSEUM
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F. G. A. M. SMIT

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ENTOMOLOGY Vol. 8 No. 8
LONDON: 1960

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Pp. 335–366 ; 41 *Text-figures*

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NEW SIPHONAPTERA FROM EASTERN MEDITERRANEAN COUNTRIES

By F. G. A. M. SMIT

TWELVE new species or subspecies of fleas, from Egypt, Israel and Iran, are described below. The material from Egypt (Sinai) and Israel, largely collected by Dr. M. Costa as a basis for his studies for his doctoral thesis, was kindly submitted to me for study and description by Prof. O. Theodor of the Hebrew University, Jerusalem. The holotypes, allotypes and several paratypes of these new fleas, as well as specimens of known species, were generously presented to the British Museum collection of fleas at Tring by Professor Theodor, to whom I am deeply indebted for this valuable donation. I am also very grateful to Dr. Costa for his great enterprise in collecting fleas in Israel, a country which is zoogeographically of great interest since its fauna contains elements of African, European and Asian origin, apart from endemic species.

Dr. G. Bouvier, Director of the Galli-Valerio Institute at Lausanne, very kindly presented some fleas, one of them new to science, which were collected by Dr. F. Schmid in Iran.

The material of the two new subspecies of *Nosopsyllus sarinus* was already in the collection of fleas at Tring.

Ctenocephalides arabicus multispinosus subsp. n.

(Text–fig. 1)

TYPE MATERIAL : Male holotype, female allotype and 1 ♂, 1 ♀ paratypes from Wadi Karkara, Israel, from *Procavia capensis syriaca*, 3.viii.1957 (*M. Costa*).

DESCRIPTION : The only detectable difference from the nominate subspecies (which was described from Wasil in the Yemen, Arabia, from *Procavia capensis jayakari*) is that the new subspecies has 6 or 7 spines in the genal ctenidium in the male (Fig. 1) and doubtless also in the female, though the two available specimens of this sex both have 7 genal spines on each side of the head. In the original description (Jordan, 1925 : 97, repeated by Hopkins & Rothschild, 1953 : 142) it is stated that *C. arabicus* has one to three genal spines, but re-examination of the type series (1 ♂, 4 ♀) showed that in some of the specimens one or two spines are broken off and that the number of genal spines is actually 3 or 4 (in three specimens 3 on each side, in the other two 3 on one side of the head, 4 on the other). Jordan (1925 : 97) gives the number of spines in the pronotal ctenidium as 9 in the male, 11 or 12 in the female. Actually, in the male it is clear that a dorsal spine is broken off and that the number is therefore 10. Only one of the four females has 11 pronotal spines, the other three specimens all have 12 spines. In *C. arabicus multispinosus* there are 10 pronotal spines in the male, 12 in the female. These appear to be the normal numbers ; the sexual difference in these numbers is worth noting.

REMARKS : It is most unusual to evaluate differences in the number of spines of a genal ctenidium as being of no greater than subspecific significance, but in the genus *Ctenocephalides* there is a strong tendency for this ctenidium to become vestigial and the number of spines is in this instance obviously of no great phylogenetic importance.

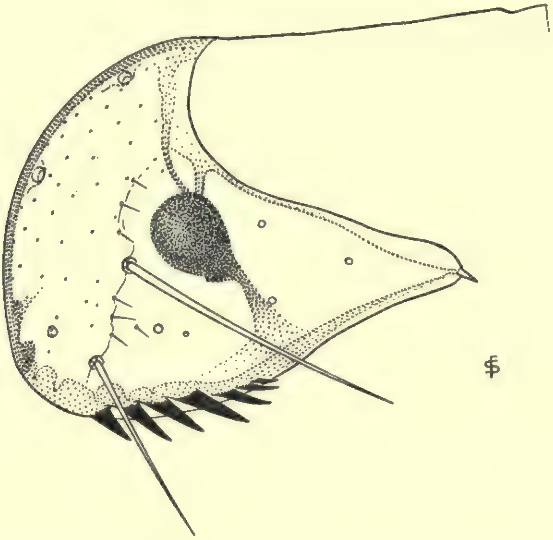


FIG. 1. *Ctenocephalides arabicus multispinosus* subsp. nov. Preantennal part of head (holotype).

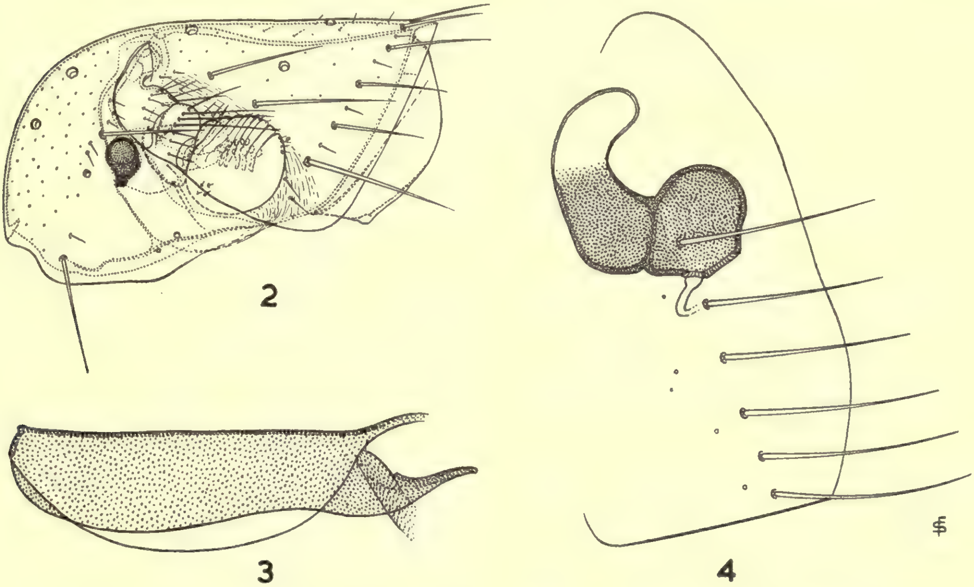
Xenopsylla dipodilli sp. n.

(Text-figs. 2–7)

TYPE MATERIAL : Collected by M. Costa from *Gerbillus* (*Dipodillus*) *dasyurus* : male holotype and 2 ♂, 2 ♀ paratypes from Wadi Nafkh, Israel, 11.iv.1955, female allotype from Qasr Mahalla (Raman), Israel, 12.iv.1955 ; 2 ♂ 2 ♀ paratypes from Wadi Raman, 25.x.1954 ; 1 ♂ paratype from Eilath, Israel, 12.iv.1954 ; 1 ♂ paratype from Ras ez Zuweira, Israel, 3.iii.1955 ; 1 ♂, 1 ♀ paratypes from Ein el Kudeirath, Sinai, Egypt, 30.xi.1956. Collected by O. Theodor from *Meriones crassus* : 1 ♂ paratype from Wadi Jureir, Negev, Israel, 1.iv.1955.

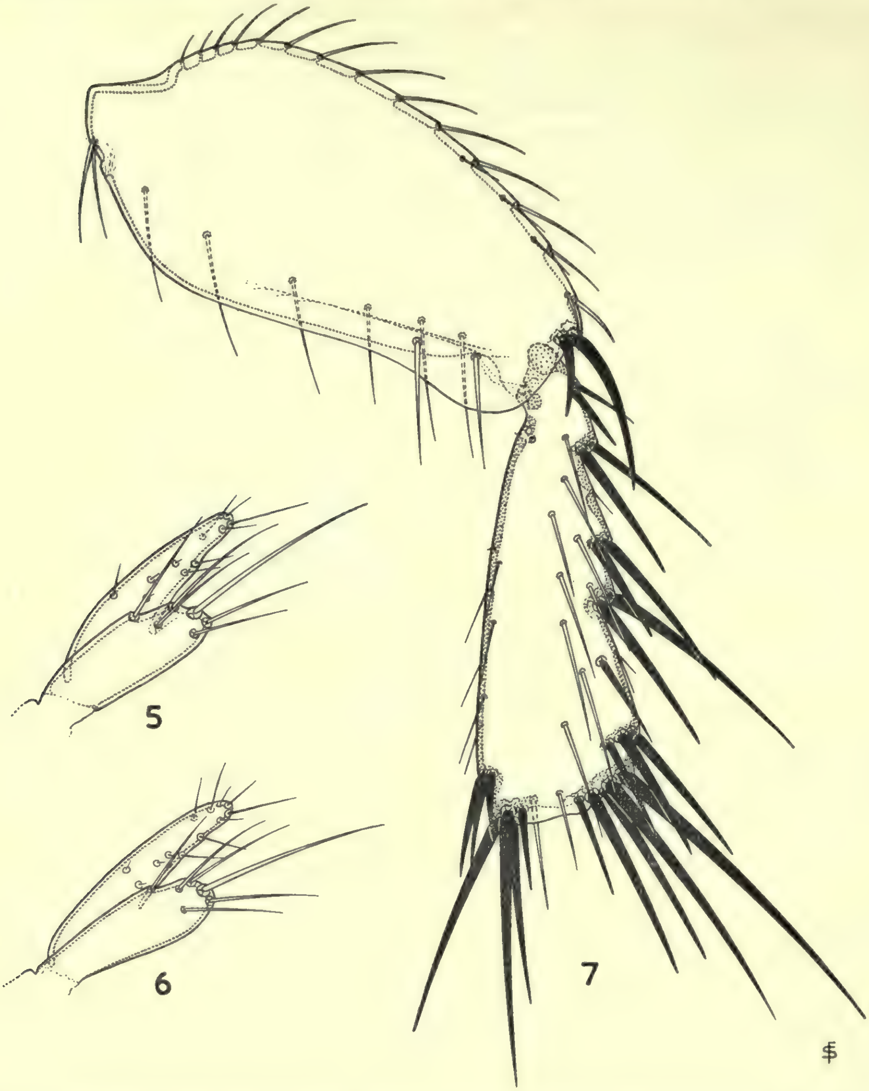
The following paratypes, all collected by Dr. H. Hoogstraal of the U.S. Navy Medical Research Unit at Cairo, are in the collection of Col. R. Traub, who generously invited me to study them and to incorporate their data in this description : 1 ♂ from Yemen, Arabia, 4000 ft., from a gerbil, 17.1.1951 ; 1 ♀ from Yemen, 3700 ft., from a gerbil, 20.I.1951 ; 2 ♀ from St. Catherine's Monastery, Sinai, Egypt, 5000 ft., from *Gerbillus calurus*, 16.v.1953 ; 3 ♀ from Wadi El Sheikh, nr. St. Catherine's Monastery, 5000 ft., from *Gerbillus* (*Dipodillus*) sp., v.1953 ; 1 ♂ from the same locality, from *Meriones* sp., 19.v.1953 ; 1 ♀ from El Raba, nr. St. Catherine's Monastery, 5000 ft., from *Gerbillus calurus*, 17.v.1953.

DIAGNOSIS : This new species is nearest related to *Xenopsylla nubica* (Rothschild, 1903) and differs from it by the following features : (*a*) a considerably smaller eye, (*b*) a more rounded antennal clava, (*c*) absence of a tooth-like projection on the anterior part of the ventral margin of the hind femur, (*d*) the penultimate notch of the hind tibia bears three setae, (*e*) fewer setae in the tergal rows, (*f*) while the male genitalia are almost identical with those of *X. nubica*, the spermatheca of the female differs considerably from that of the latter species. A related species, *X. nesokiae* Ioff, a parasite of *Nesokia indica* in Central Asia, also has a small eye, but its aedeagus is like that of *X. astia* Rothschild.



FIGS. 2–4. *Xenopsylla dipodilli* sp. nov. 2. Head (♂ paratype from Wadi Nafkh). 3. Aedeagal apodeme (holotype). 4. Sternum VII and spermatheca (allotype).

DESCRIPTION. *Head* (Text-fig. 2) : Eye small ; antennal clava globular (in *X. nubica* it usually has a tapering apex, especially in the male) ; occipital groove in male as shallow as in *X. nubica*, not extending on to the pronotum. *Thorax* : virtually as in *X. nubica*. *Legs* (Text-fig. 7) : two strong setae posteriorly near apex of hind coxa instead of the three usually present in *X. nubica* ; ventral margin of hind femur smoothly rounded anteriorly, without a sharp tooth-like projection such as is present in *X. nubica* ; two setae ventro-apically on outer surface of hind femur ; penultimate notch of hind tibia bearing three setae, as against two in



FIGS. 5–7. *Xenopsylla dipodilli* sp. nov. 5. Processes of clasper (holotype). 6. Processes of clasper (paratype from Wadi Nafkh). 7. Hind femur and tibia (allotype).

X. nubica; longest seta of first hind tarsal segment reaching to or a little beyond apex of second segment; longest seta of second hind tarsal segment reaching to or beyond middle of fifth segment. *Abdomen*: terga III–VI with a row of 6–8 setae on each side in both sexes (in *X. nubica* 9–12). In other respects the unmodified abdominal segments resemble those of *X. nubica*.

Male (Text-figs. 3, 5, 6): Modified segments and genitalia virtually identical with those of *X. nubica*; processes of clasper as in Text-figs. 5 and 6; aedeagal apodeme as in Text-fig. 3. The aedeagus may differ in some small details, but in mounted specimens of *X. nubica* the apical portion of this structure is distorted in various ways and on the basis of available material I cannot make out with certainty what the normal arrangement would be like.

Female (Text-fig. 4) : Terminal segments almost as in *X. nubica.* Bulga of spermatheca forming an almost hemispherical expansion opposite the orifice of the duct, its lower margin fairly straight ; base of hilla not broader than the bulga and only slightly ventricose ; the dark coloration extends to beyond the middle of the hilla. On the whole the spermatheca is reminiscent of that of *X. brasiliensis* (Baker) rather than that of *X. nubica.*

LENGTH : ♂ 1½ mm., ♀ 1½–2 mm. (*X. nubica* : ♂ 1½–2 mm., ♀ 2–2¼ mm.).

Ctenophthalmus* (*Euctenophthalmus*) *congener tenuistigmatus subsp. n.

(Text-figs. 8, 9)

Ctenophthalmus congener Roths. (*nec* Rothschild, 1907). Costa, 1954, *Bull. Res. Council Israel* 4 (3) : 293–296 [locality not mentioned, but Prof. O. Theodor informed me that the 202 ♂ and 149 ♀ recorded in Costa's paper were collected at Ginegar in the Plain of Esdraelon, south of Nazareth, Israel].

TYPE MATERIAL : Collected by M. Costa from *Microtus guentheri* : male holotype and 2 ♂ paratypes from Mishmar Haemek, Israel, 4.i.1953 ; female allotype and 1 ♂, 2 ♀ paratypes from Mishmar Haemek, 10.i.1953 ; 1 ♂, 1 ♀ paratypes from Mishmar Haemek, 2.i.1953 ; 11 ♂, 11 ♀ from Ginegar, Israel, 6.viii.1947 (1 ♂, 1 ♀), 22.viii.1947 (2 ♂, 2 ♀), 23.viii.1947(2 ♂), 4.ix.1947 (1 ♂, 1 ♀), 7.ix.1947 (2 ♂, 2 ♀), 3.x.1947 (3 ♂, 5 ♀).

DESCRIPTION : This new subspecies is closely related to *C. congener allousei* Hubbard, 1956 (from Kurdistan, Iraq), and differs from it by (*a*) the pronotum being longer in relation to the length of the pronotal spines, (*b*) a longer dorsoposterior margin of the fixed process of the clasper (Text-fig. 8), with four long setae situated along this margin as against three in *C. congener allousei*, (*c*) a considerably smaller spiracular fossa of tergum VIII of the female (Text-fig. 9) (In certain genera there seems to be a correlation between the size of the spiracular fossae (especially the one on tergum VIII) and the humidity of the fleas' habitat—the size of the fossae becoming greater with an increase in the relative humidity.) The movable process of the clasper (Text-fig. 8) is on the whole apically broader than in *C. congener allousei*, but there is some variation in this width and in some specimens the process is almost identical with that of the latter subspecies.

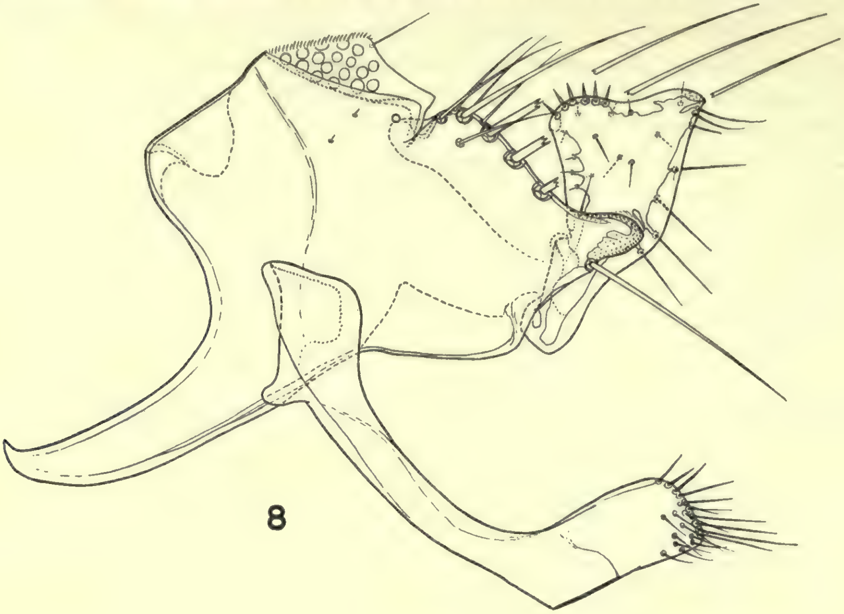
LENGTH : ♂ 2 mm., ♀ 2½ mm.

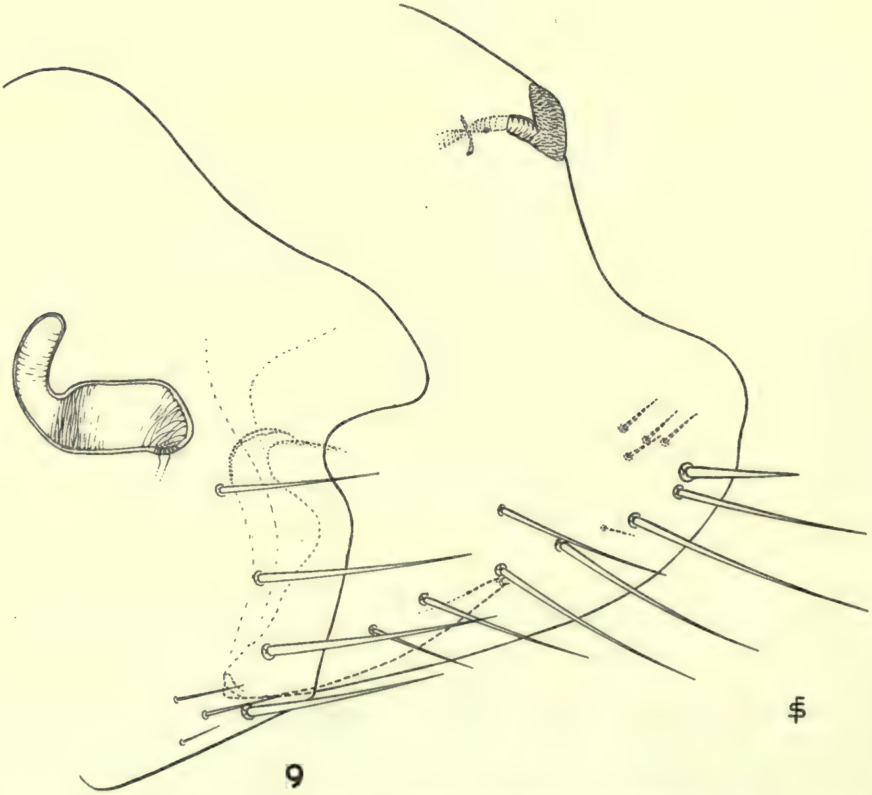
Ctenophthalmus* (*Euctenophthalmus*) *iranus persicus subsp. n.

(Text-figs. 10–13)

TYPE MATERIAL : Male holotype and female allotype collected at Kazvin, Iran, from a burrow of *Meriones persicus*, in 1955, by F. Schmid.

DIAGNOSIS : The male of this new subspecies is distinguishable from that of





Figs. 8–9. *Ctenophthalmus* (*Euctenophthalmus*) *congener tenuistigmatus* subsp. nov. 8. Clasper and sternum IX (holotype). 9. Sternum VII, segment VIII and spermatheca (allotype).

C. iranus iranus Argyropulo, 1935 (from Azerbaijan*) by (*a*) the ventral emargination of the posterior margin of sternum VIII, (*b*) the much narrower dorsal portion of the movable process of the clasper which is longer than that of the nominate subspecies, (*c*) the more strongly pronounced sclerotic dorso-posterior angle of the movable process, (*d*) the relatively shorter distal arm of sternum IX. The female appears to be indistinguishable from that of the nominate subspecies. It should be noted that I have not seen any specimens of the nominate subspecies, so I am relying on Argyropulo's description and figures for the differences between the subspecies.

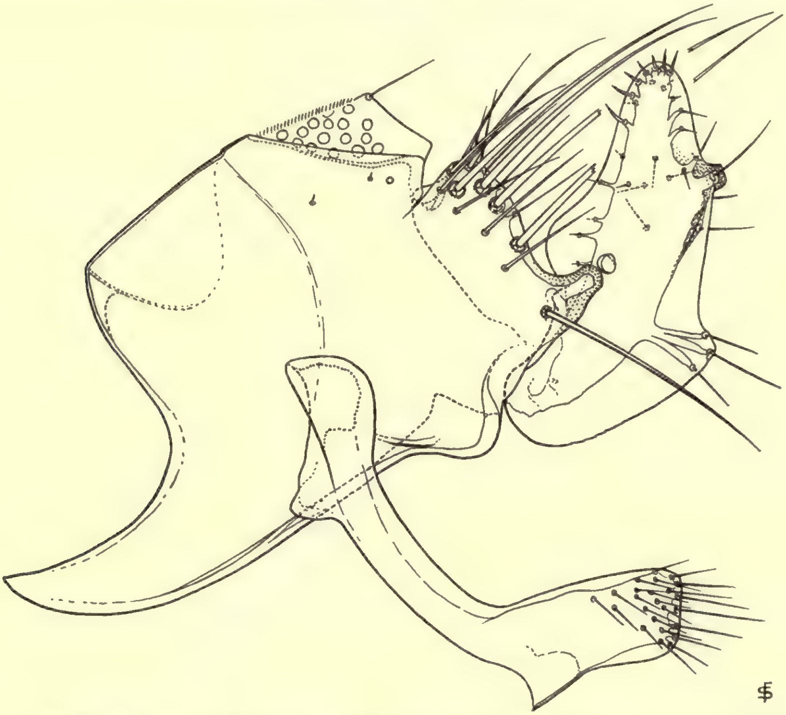


FIG. 10. *Ctenophthalmus* (*Euctenophthalmus*) *iranus persicus* subsp. nov. Clasper and sternum IX (holotype).

DESCRIPTION : Labial palp reaching to about four-fifths the length of the fore coxa. Pronotal ctenidium with 18 spines in the male, 16 in the female ; these spines are slightly longer than the pronotum. Longest seta of second hind tarsal segment not quite reaching the middle of the fourth segment. Terga I–IV with one marginal spinelet on each side in both sexes (although in the female the spinelet is absent on one side of tergum IV). Numbers of setae in the main row on each side of terga I–VII in the male : 5, 7 or 8, 7, 7, 6, 7, and 6 respectively, in the female : 5, 7 or 8, 7, 6, 6 or 7, 6 and 4 respectively. Basal abdominal sternum with a pair of ventral setae in

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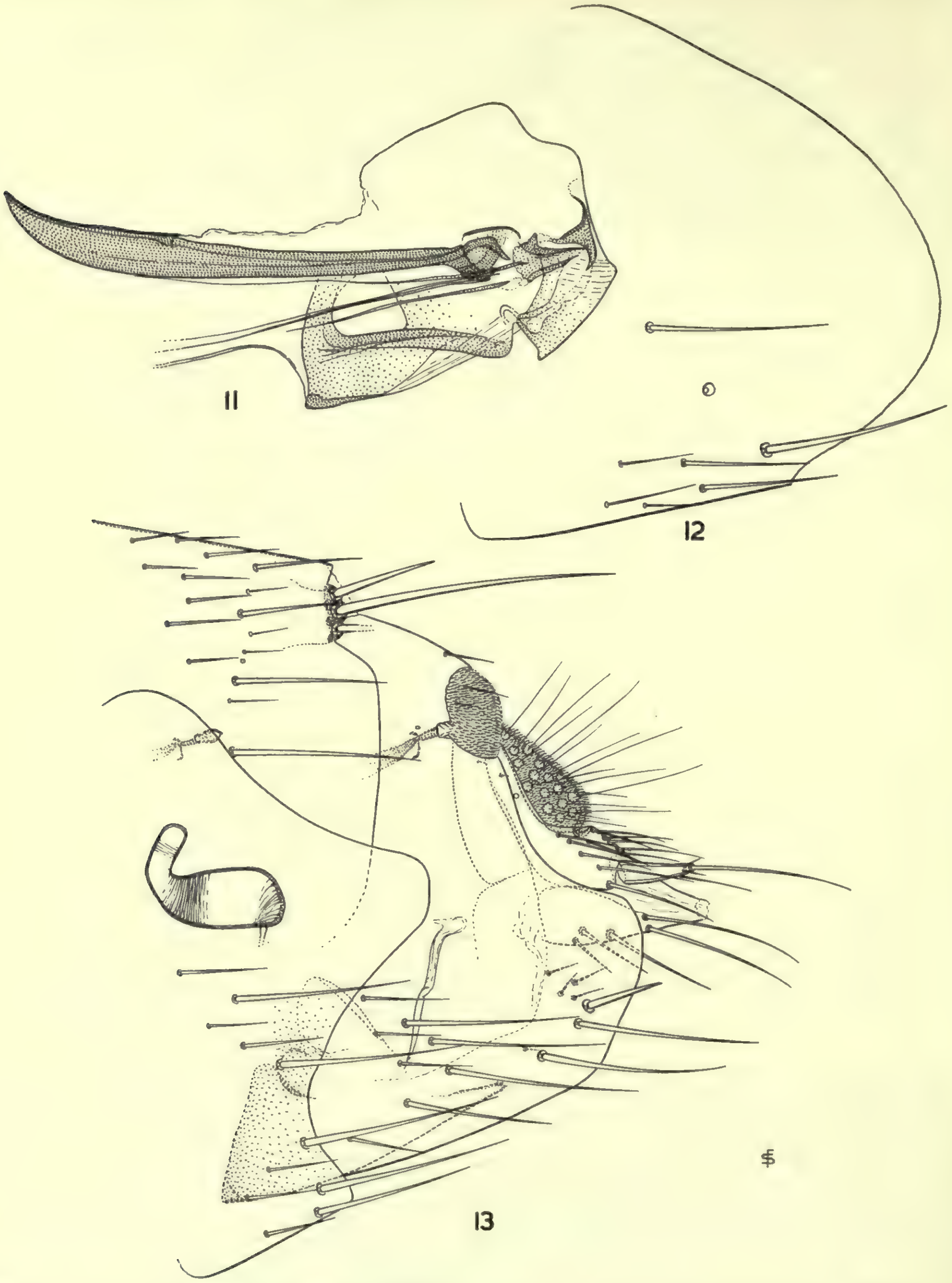
* Argyropulo (1937 : 105) gives the latitude and longitude of the localities (the neighbourhood of the villages Kalakhana and Kyal'zyaz) from which he obtained material as 38°39′ N., 66°E. ; the longitude must be incorrect since it would indicate a place in Uzbekistan and it is perhaps a slip for 46°E.



FIGS. 11–13. *Ctenophthalmus* (*Euctenophthalmus*) *iranus persicus* subsp. nov. 11. Phallosome (holotype). 12. Sternum VIII (holotype). 13. Terminal abdominal segments and genitalia (allotype).

the male, with a vertical row of 2 or 3 setae in the female; sterna III–VII with a main row of four setae each side in the male, sterna III–VI with a main row of five setae in the female.

Male (Text-figs. 10–12): Two or three small setae in front of the spiracular fossa of tergum VIII. Posterior margin of sternum VIII (Text-fig. 12) minutely serrate, smoothly rounded and ventrally slightly emarginate. Fixed process of clasper (Text-fig. 10) with four large and about a dozen smaller setae; the narrow ventral lobe without a small dorso-apical seta; acetabular seta large, inserted well away from the margin. Movable process elongate, its anterior margin strongly bulging just above the acetabular portion; the dorso-anterior angle greatly drawn out so that the upper part of the movable process is shaped like a sugar-loaf, at the base of which the dorso-posterior angle forms a strongly sclerotized squarish projection; the group of setae on and near the posterior margin is placed rather low down at a projection of the margin and consists of only three setae (in the majority of species of the genus this group invariably consists of four setae): fovea small and circular; seven sensilla along the dorso-anterior angle. Distal arm of sternum IX (Text-fig. 10) short and broad, with numerous short setae in its apical half. Phallosome as in Text-fig. 11.

Female (Text-fig. 13): Posterior margin of sternum VII forming a large bluntly triangular lobe; the lower setae of the main row are placed quite near the posterior margin. Tergum VIII with 2 or 3 setae over and above the spiracular fossa; posterior margin of this tergum broadly rounded, without a sinus; four or five genital setae on the inner surface. Apical part of sternum VIII narrow. Ductus bursae very long, much longer than the dorsal pronotal spines. Spermatheca of the usual type, as shown in Text-fig. 13.

LENGTH: ♂ ♀ 2½ mm.

Ophthalmopsylla* (*Ophthalmopsylla*) *volgensis palestinica subsp. n.

(Text-figs. 14–16, 21)

TYPE MATERIAL: Male holotype and female allotype from Beer Hafir, Israel, from *Jaculus jaculus*, 25.iii.1957 (*M. Costa*).

DIAGNOSIS: At once distinguishable from the seven known subspecies of *O. volgensis* by (*a*) the middle seta of the ocular row being situated much nearer the lower than the upper ocular seta (in the other available subspecies this seta is placed midway between the upper and lower setae of the row), (*b*) the great reduction of the frontal row of setae, which is reduced to only one small seta in the male and none in the female (in the other subspecies the frontal row consists of at least three setae). In the latter respect females of the new subspecies resemble those of *O. praefecta* sspp. (in which the row is present in the male), but in other characters the new form is a typical representative of the *volgensis*-complex. The genitalia of the male differ to some extent from those of the other subspecies, but this is not the case in the female, which is therefore indistinguishable from other subspecies in the structure of the terminal abdominal segments and genitalia.

DESCRIPTION : Chaetotaxy of head (Text-fig. 14) as described in the diagnosis. Pronotal ctenidium with 20 spines in the male, 22 in the female. Outer lateral surface of hind tibia with 10–11 setae in the male, 8–10 in the female. Posterior margin of hind tibia with one short but stout seta between the penultimate group of two setae and the fifth group of setae from the base. Metanotum with two marginal spinelets on each side in both sexes. Terga I–IV with one marginal spinelet each side (in the female only on one side of tergum IV, the spinelet being absent on the other side). Numbers of setae in the main row on each side of terga I–VII in the male : 4, 7, 7, 7, 7, 5 or 6 and 5 or 6 respectively, in the female : 4 or 5, 7, 7 or 8, 7, 7, 7 and 6 respectively. Basal abdominal sternum with, apart from a ventral seta, 1 or 2 lateral setae per side in the male, 2 such setae in the female. Sterna III–VII in the male with the following numbers of setae each side : 3, 2 or 3, 3, 3, and 3 ; sterna III–VI in the female with 3, 3 or 4, 3 and 4 setae respectively.

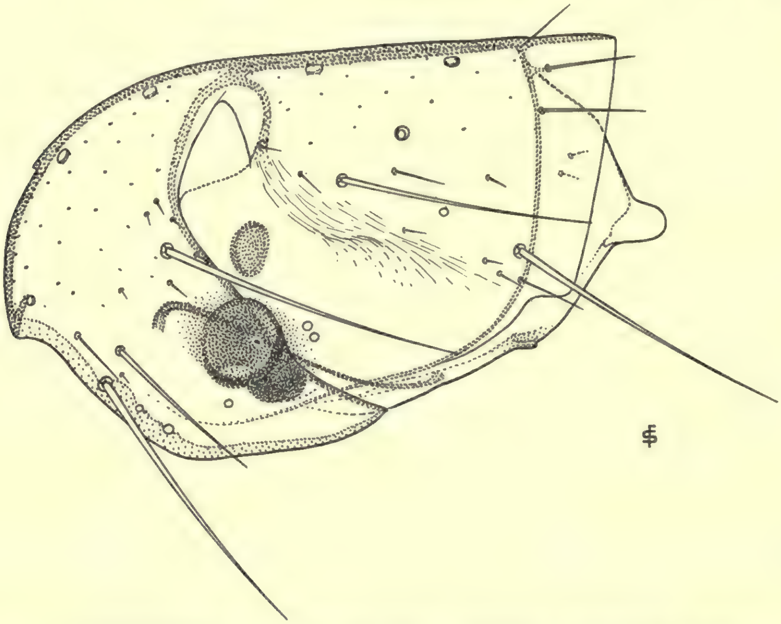


FIG. 14. *Ophthalmopsylla* (*Ophthalmopsylla*) *volgensis palestinica* subsp. nov. Head (holotype).

Male (Text-figs. 15, 16) : Sternum VIII (Text-fig. 15) of the same peculiar structure as in the other subspecies. Tip of fixed process of clasper reaching a little beyond the middle of the anterior margin of the movable process ; corpus of clasper and manubrium virtually as in other subspecies. Movable process of clasper broad, widest in its middle, with a rounded posterior margin ; the two spiniform setae at the hind margin not close together, while the seta above the upper spiniform is not transformed into a spiniform (as is the case in the nominate subspecies, for instance) : chaetotaxy of movable process as shown in Text-fig. 15. Distal arm of sternum IX (Text-fig. 15) straight, even its tip hardly at all upturned ; ventrally

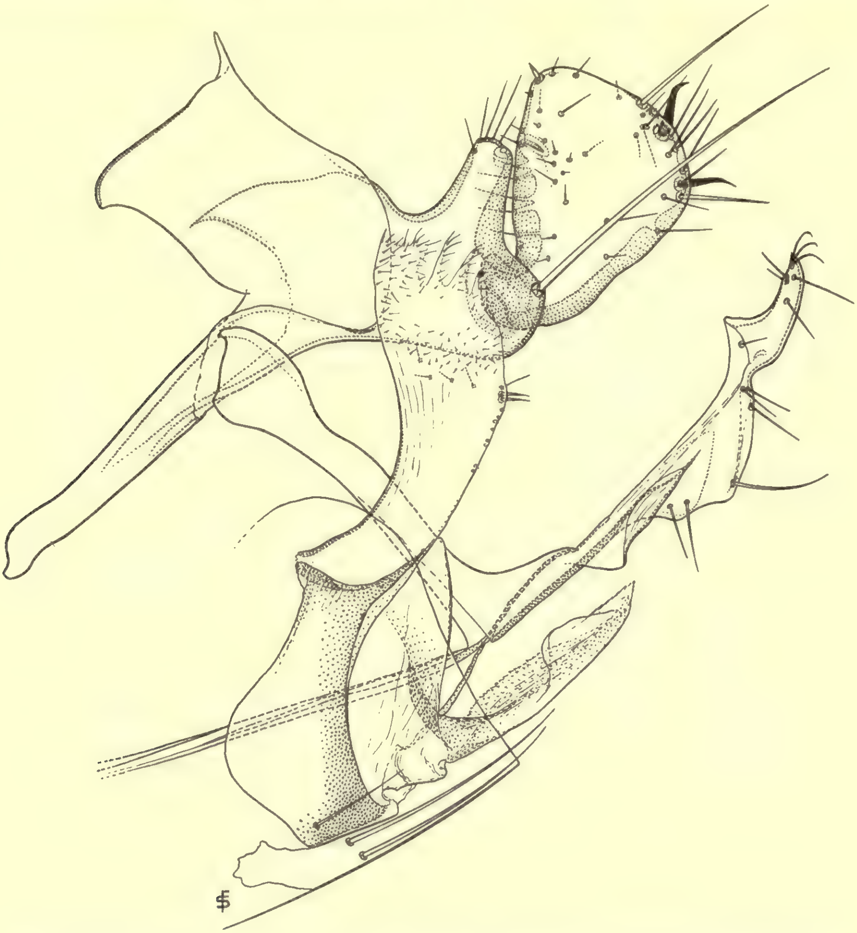


Fig. 15. *Ophthalmopsylla* (*Ophthalmopsylla*) *volgensis palestinica* subsp. nov. Clasper and sterna VII–IX (holotype).

this arm forms a fairly large triangular lobe which bears half a dozen setae. Aedeagus as in Fig. 16. Thus far no use had been made of the structure of the aedeagus in separating the subspecies of *O. volgensis*. Text-figs. 17–20 show the aedeagi of the four other subspecies of which I have material available for study* ; note the differences in (*a*) the degree of sclerotization of the dorsal margin, (*b*) shape and place of attachment of the dorso-apical membranous lobe, (*c*) the shape of the ventral lateral lobe, and (*d*) the structure of the hamulus.

Female (Text-fig. 21) : All characters of the terminal segments and of the genitalia are shown in the figure, which obviates a detailed description.

LENGTH : ♂ 2¼ mm., ♀ 2¾ mm.

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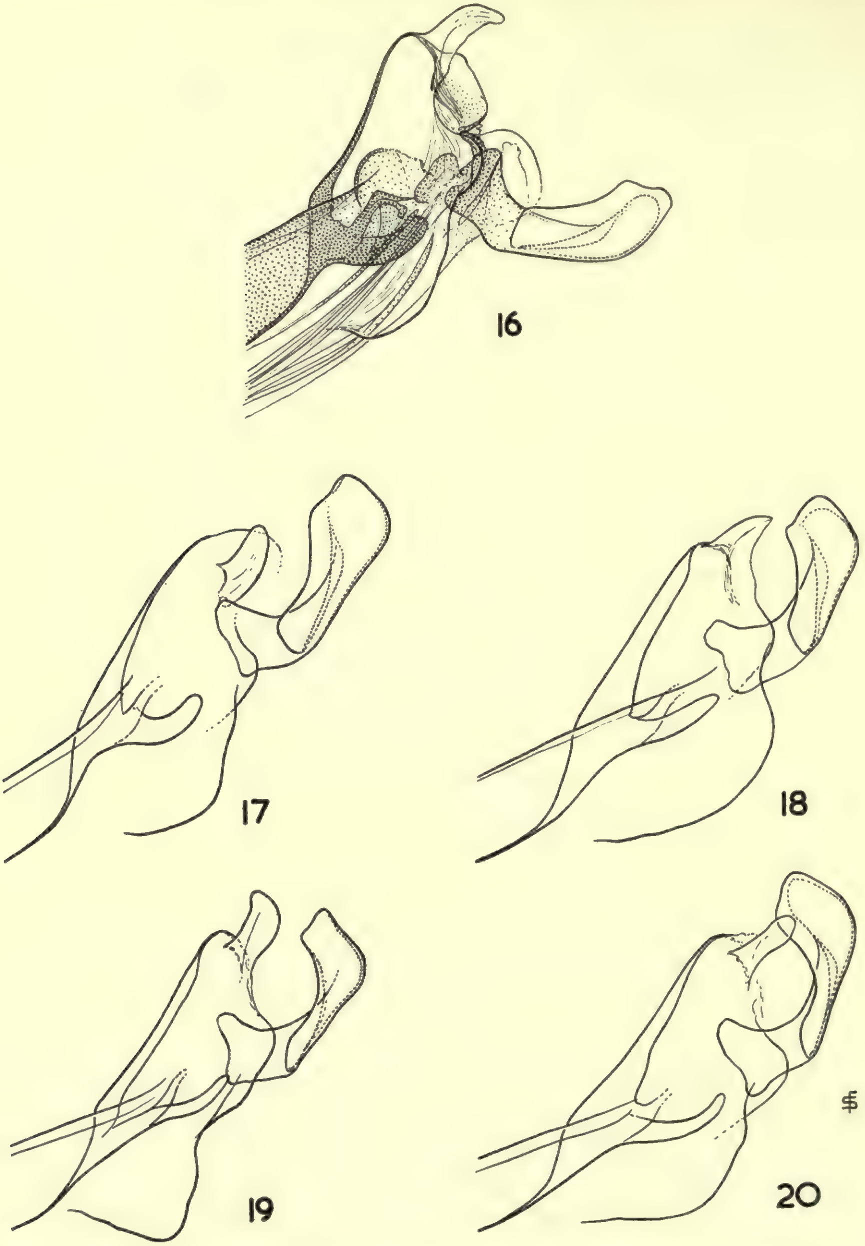
* My grateful thanks are due to Dr. M. A. Mikulin, of the Antiplague Research Institute at Alma-Ata, for having sent us specimens of *O. v. intermedia* and *O. v. transcaspica*, and to Col. R. Traub for material of *O. v. arnoldi* which was collected by Dr. H. Hoogstraal of the U.S. Navy Medical Research Unit No. 3.



FIGS. 16–20. Aedeagus of subspecies of *Ophthalmopsylla* (*Ophthalmopsylla*) *volgensis*: 16. *O. v. palestinica* (holotype). 17. *O. v. volgensis* Wagner & Ioff (from western Kazakhstan). 18. *O. v. arnoldi* Wagner & Argyropulo (from the Van Province, Turkey). 19. *O. v. intermedia* Argyropulo (from Byet-Pak-Dala, eastern Kazakhstan). 20. *O. v. transcaspica* Zagniborodova & Mikulin (from the Kazandshik rayon, Turkmenia).

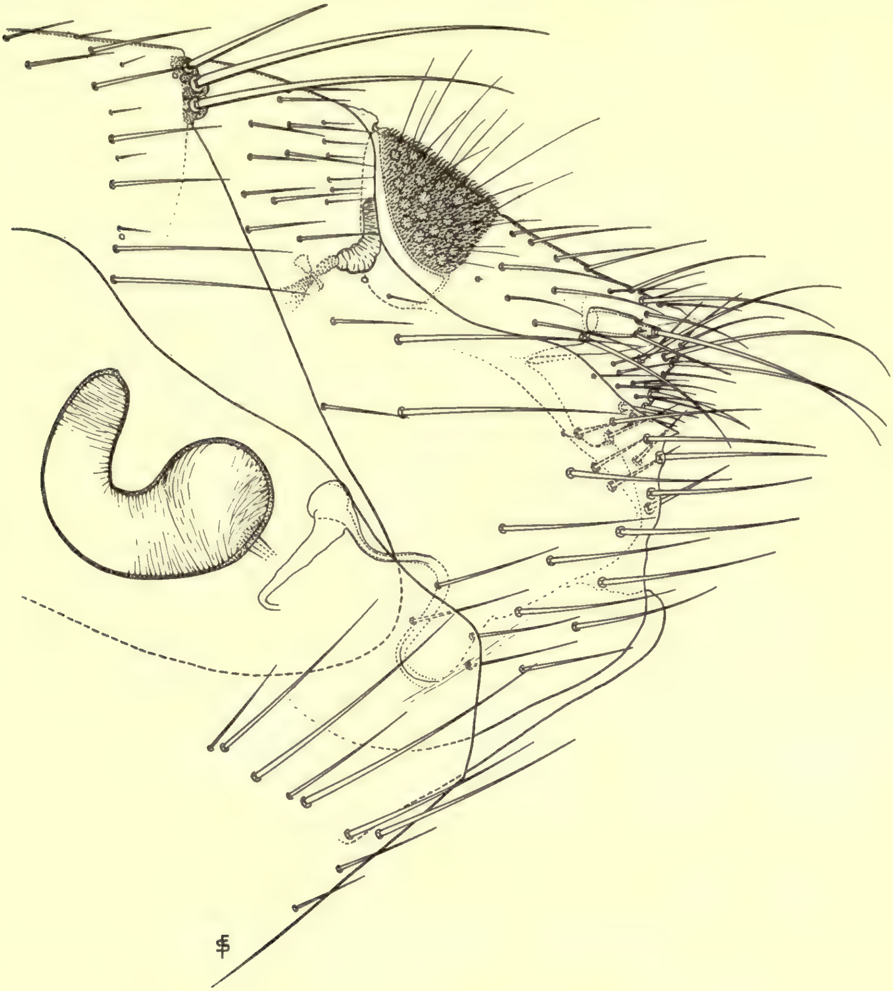


FIG. 21. *Ophthalmopsylla* (*Ophthalmopsylla*) *volgensis palestinica* subsp. nov. Terminal abdominal segments and genitalia (allotype).

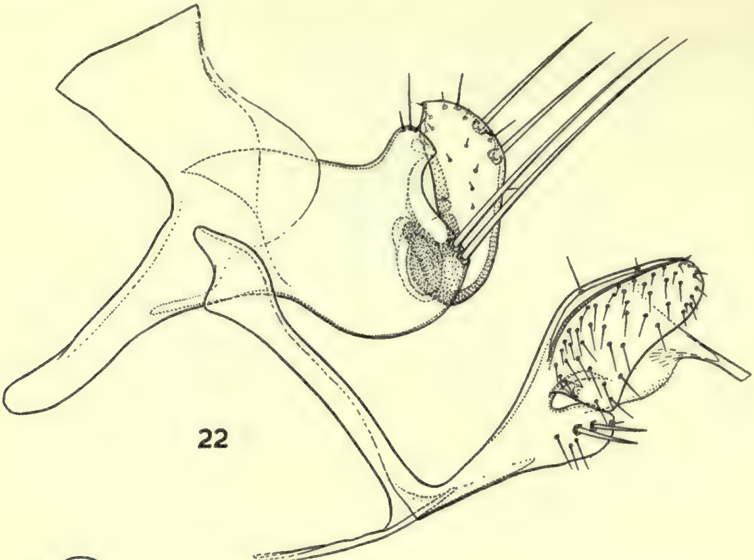
Nosopsyllus* (*Nosopsyllus*) *sarinus aryanus subsp. n.

(Text-figs. 24, 26)

TYPE MATERIAL : Male holotype, female allotype and 1 ♂ 1 ♀ paratypes from Abadan, south-west Iran, from rats, 1936 (*D. C. Rennie*).

DESCRIPTION : This new subspecies differs from the nominate subspecies *N. sarinus sarinus* (Jordan & Rothschild, 1929) (from Adana, Turkey) only in genitalic structures.

Male (Text-fig. 24) : The fixed process of the clasper is longer than in *N. s. sarinus* (Text-fig. 22) and the movable process is widest at about the middle, not in its apical



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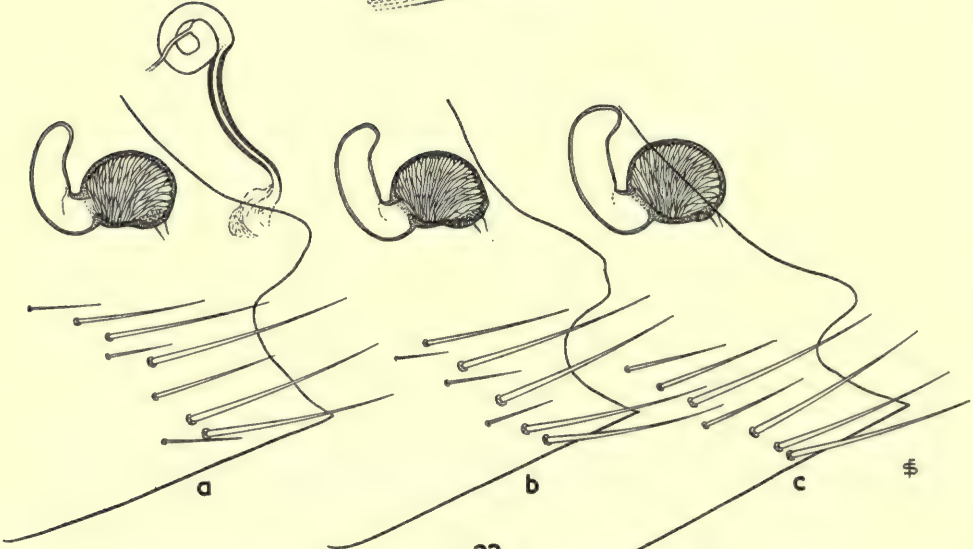

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FIGS. 22, 23. *Nosopsyllus* (*Nosopsyllus*) *sarinus sarinus* (Jordan & Rothschild, 1921). 22. Clasper, sternum IX and aedeagal hamulus (lectotype). 23. Sternum VII and spermatheca (paratypes).

of the movable process in ssp. *aryanus*. Distal arm of sternum IX (Text-fig. 24) portion ; the two strong setae at the posterior margin are situated at a lower level than in the nominate subspecies because of the greater length of the apical portion with a very long and narrow dorsal submarginal sclerotization, characteristic for the species, and one minute apical subspiniform seta. Aedeagal hamulus (Text-fig.

24) with a narrow and rather long apical part, more or less as in the other two subspecies.

Female (Text-fig. 26): Posterior margin of sternum VII forming a short, broad and very blunt lobe, below which the straight margin meets the ventral margin at an angle approaching a right angle. In *N. sarinus sarinus* (Text-fig. 23 a–c; the corresponding figures in the original description are not perfectly correct) the posterior margin of sternum VI forms a much more strongly projecting and narrower lobe, below which the margin meets the ventral margin at an acute angle. There are no striking differences in the ductus bursae or in the spermatheca.

LENGTH: ♂ 2–2¼ mm., ♀ 2½–3 mm.

Nosopsyllus* (*Nosopsyllus*) *sarinus parthius subsp. n.

(Text-fig. 25)

TYPE MATERIAL: Male holotype from Mahun, 6000 ft., about 20 miles S.S.E. of Kirman, Iran, vii–x.1950, from *Mus musculus*, collected by a member of the Oxford University Expedition to Persia.

DESCRIPTION: This subspecies, only known from the male sex, also differs from the two related forms only by genitalic structures.

Male (Text-fig. 25): The fixed process of the clasper is about the same length as that of *N. sarinus aryanus*, but is more upright and therefore looks longer. The movable process is longer and narrower than that of the other two subspecies and the angle of the anterior margin, not far from the pointed apex, is much more prominent because the margin between the angle and the apex is concave. Sternum IX and aedeagal hamulus not much different from those of *N. s. sarinus* and *N. s. aryanus* (Text-fig. 25, *cf.* Text-figs. 22 and 24).

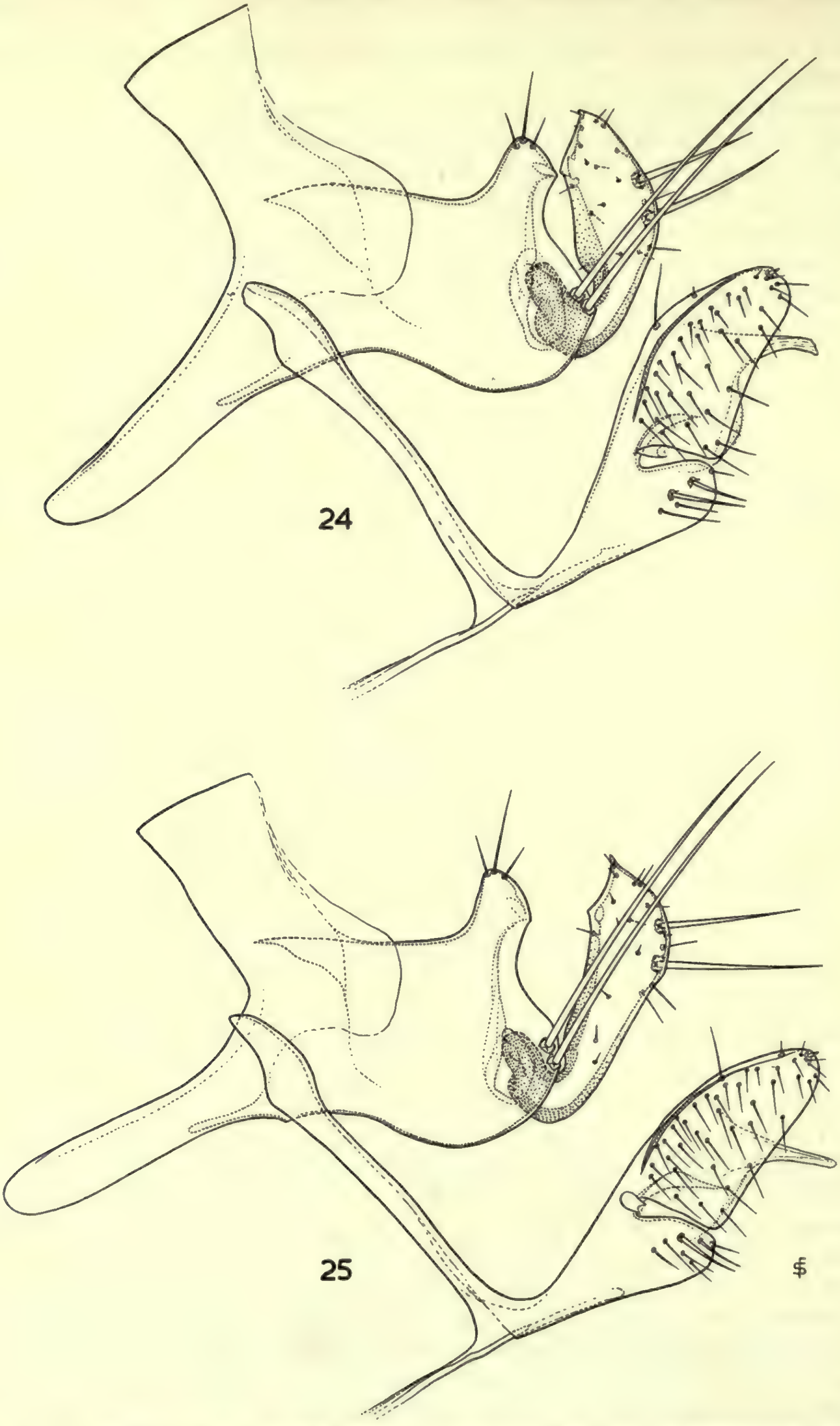
LENGTH: ♂ 2¼ mm.

Genus ***NOSOPSYLLUS*** Jordan, 1933

Nosinius subgen. n.

Distinguishable from the nominate subgenus and from subgenus *Gerbillophilus* by (*a*) the larger number of pronotal spines (26 or 27 as against an average of 20 in all other species), (*b*) the more numerous pseudosetae under the mesonotal collar (9 or 10 as against an average of 6 in all other species), (*c*) the first pair of lateral plantar setae being shifted on to the plantar surface more or less in between the members of the second lateral pair (in some species of the other subgenera there is a tendency towards this shift), (*d*) the more numerous setae on the abdominal segments; one or two setae of the tergal main rows are situated below the level of the spiracle in the male, two or three in the female, (*e*) the subequal length of the three antesensilial setae in the female (in all other species the upper seta never reaches much beyond half the length of the middle seta, and the lower seta is always at least a little shorter than the middle one).

Type of subgenus: the new species described below.



FIGS. 24, 25. Clasper, sternum IX and aedeagal hamulus of: 24. *Nosopsyllus* (*Nosopsyllus*) *sarinus aryanus* subsp. nov. (holotype). 25. *Nosopsyllus* (*Nosopsyllus*) *sarinus parthius* subsp. nov. (holotype).

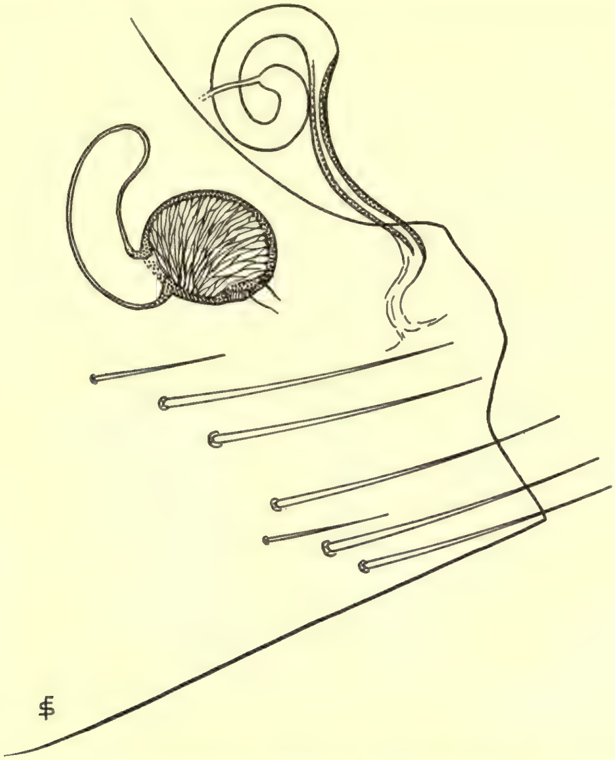


FIG. 26. *Nosopsyllus* (*Nosopsyllus*) *sarinus aryanus* subsp. nov. Sternum VII, ductus bursae and spermatheca (allotype).

Nosopsyllus* (*Nosinius*) *sinaiensis sp. n.

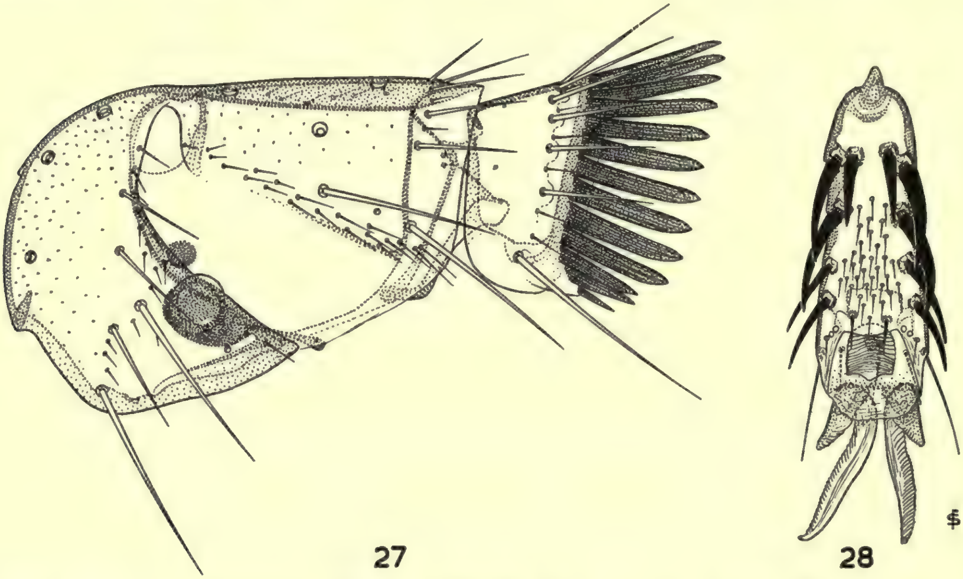
(Text-figs. 27–30)

TYPE MATERIAL : Male holotype, female allotype and 1 ♂ paratype from the Libne Junction, Sinai Peninsula, Egypt, from *Gerbillus gerbillus*, xii.1956 (*M. Costa*).

DIAGNOSIS : The new species is immediately distinguishable from all other known members of the genus by the characters mentioned in the description of the subgenus.

DESCRIPTION : *Head* (Text-fig. 27) : Frontal tubercle about in the middle of the frons in the male, while in the female (in which the exact dorsal end of the frons cannot be determined with certainty owing to the much lower point of implantation of the antennae) the tubercle is situated at a corresponding distance from the oral angle. In front of the antennal fossa, above the well-developed eye, a row of two setae (absent in the female) and a number of minute ones. Ocular row in both sexes consisting of three setae of which the central one is thinner and much shorter than the outer ones. Labial palp reaching to about the apex of the fore coxa. The antennal fossa is dorsally bordered by a row of 19–20 small setae in the male and 12–14 in the female. Postantennal region with one long seta above the middle of the clava. The occipital row consists in the male of five setae each side, of which the lowest is large and is separated by a gap from the more dorsal ones ; there is an additional seta near the dorsal margin just in front of the uppermost seta of the occipital row. In the female the occipital row consists of six setae each side and the gap between the lowest seta and the next is much smaller than in the male.

Thorax : Pronotum (Text-fig. 27) with a row of usually 12 setae on the two sides together in both sexes. Pronotal ctenidium with 26 or 27 slender spines in the male, 26 in the female ; these spines are a little longer than the pronotum. Mesonotum with two rows of setae, apart from the anterior patch of numerous small setae, most of which are covered by the pronotal spines ; the first row consists of four or five small setae on each side, the main row of six setae. A row of 9 or 10 pseudosetae each side under collar of the mesonotum. Mesepisternum generally with 10–12 small and two larger setae in the male, in the female with 17 or 18 small ones and two or three larger ones. Mesepimeron with six or seven setae. Metanotum also with two rows of setae which are dorsally preceded by a few small setae ; the first row consists of six or seven setae each side, the main row of five or six ; the margin of the collar of the metanotum bears one spinelet on each side. The metepisternum has two large and usually one small setae, and the metasternum one ; the metepimeron bears 7–9 setae in the male, 9–10 in the female.



Figs. 27, 28. ***Nosopsyllus* (*Nosinius*) *sinaiensis* sp. nov. 27. Head and pronotum (♂ paratype). 28. Fifth hind tarsal segment (♂ paratype).**

Legs : Longest seta of second hind tarsal segment reaching to or a little beyond the apex of the fourth segment. First pair of lateral plantar setae of all tarsi (Text-fig. 28) shifted on to the plantar surface and placed more or less in between the members of the second lateral pair.

Abdomen : Terga I–VII with two rows of setae and also with one or a few additional small setae in front of the most dorsal ones of the anterior row ; the main row consists in the male of 6, 10, 10 or 11, 10 or 11, 11, 11 and 11 setae per side, in the female of 6, 12, 11 or 12, 11, 11, 10 or 11, and 9 or 10 setae respectively. The posterior margin of terga I–III bears one spinelet on each side in the male (on one side of tergum II two spinelets in one specimen), in the female tergum I bears two spinelets each side, tergum II only one, and the remaining terga have none.

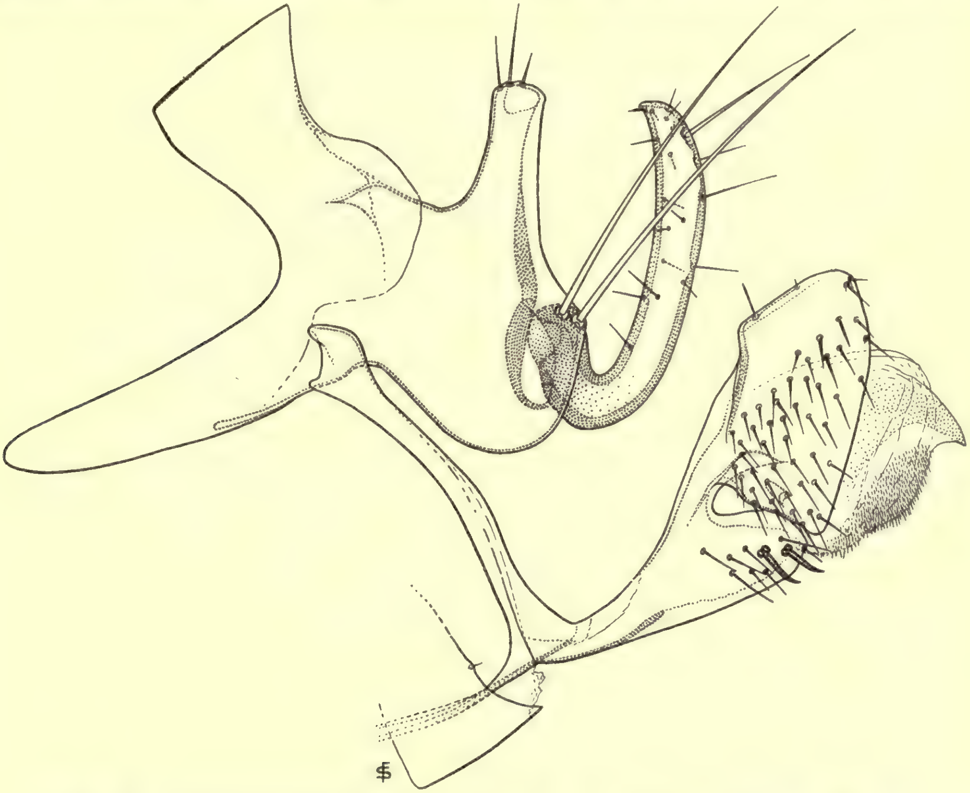


Fig. 29. *Nosopsyllus* (*Nosinius*) *sinaiensis* sp. nov. Clasper, sternum IX and aedeagal hamulus (holotype).

In both sexes three antesensilial setae of which in the male the upper is about one-sixth the length of the middle seta, while the lower is extremely minute ; in the female the three setae are of subequal length.

Basal abdominal sternum of the male with one ventral seta each side, sterna III–VII with a row of four or five setae ; in the female the basal sternum bears, apart from the ventral seta, a lateral patch of 6 or 7 slender setae, while sterna III–VI bear on each side an irregular row of 13 or 14, 8, 9 or 10, and 8 or 9 setae respectively.

Male (Text-fig. 29): Tergum VIII large, its dorsal margin with 4 or 5 setae; on the lateral surface of the tergum 14 to 18 setae and 7 or 8 small setae above the spiracular fossa. The vestigial sternum VIII as in Text-fig. 29. Fixed process of clasper very prominent, symmetrical and much longer than broad; the lower margin of the corpus of clasper strongly and symmetrically rounded. Manubrium considerably broader than is usual in species of *Nosopsyllus*. Movable process smoothly curved, very narrow and of uniform width throughout, with only one strong seta at the posterior margin, besides several smaller ones. Proximal arm of sternum IX slightly concave anteriorly and convex posteriorly, rather narrow; the distal arm broad and bearing before the deep ventral constriction two subspiniform setae and 8 thin ones; the part of the distal arm beyond the constriction has a distinct hump of the dorsal margin and there are numerous small setae none of

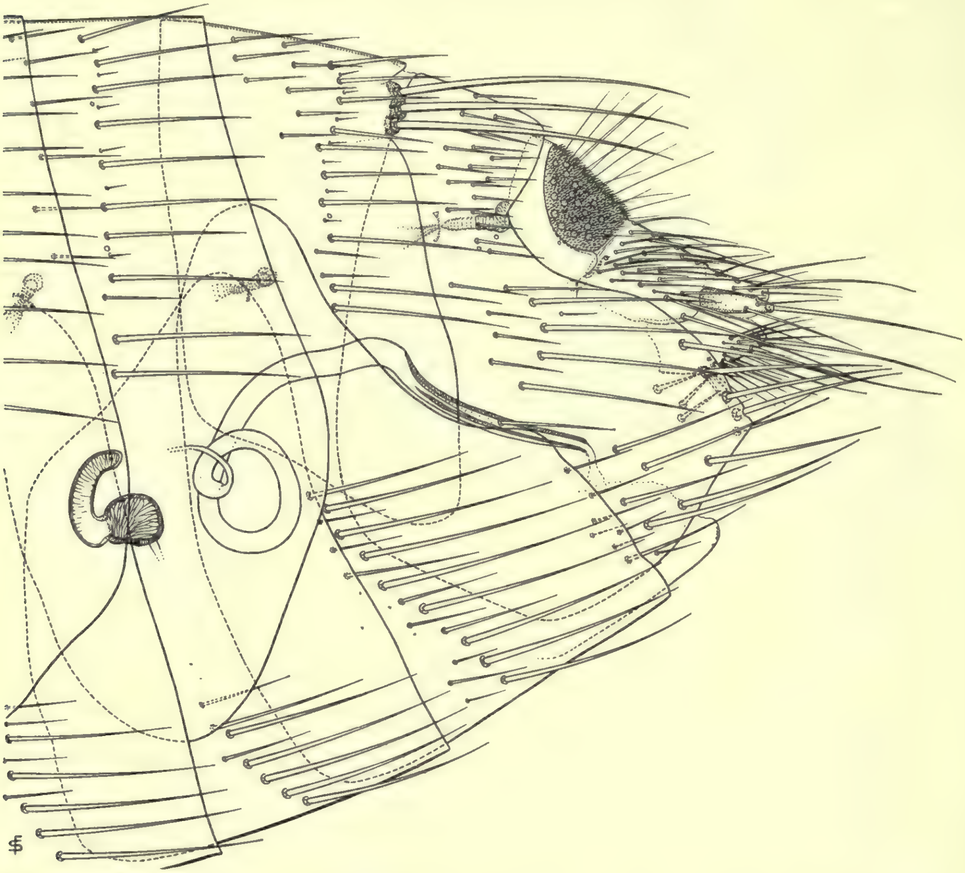


FIG. 30. *Nosopsyllus* (*Nosinius*) *sinaiensis* sp. nov. Terminal abdominal segments and genitalia (allotype).

which is really spiniform or subspiniform. Aedeagal hamulus large, shaped as shown in Text-fig. 29.

Female (Text-fig. 30) : The lower third of the posterior margin of sternum VII is almost straight and forms a right angle with the ventral margin ; above this straight portion the margin is concave ; on each side of this sternum an irregular row of 9–11 large and 7–8 smaller setae. Tergum VIII bears 18–20 small setae on the dorsal area (the patch extending to a little below the spiracular fossa), a row of 4 or 5 long setae, preceded by 4 or 5 shorter ones, below the sensilium, and on the ventral and apical area of this tergum 17–19 larger and smaller setae and 2 or 3 genital setae. The anal stylet is about 3½ times as long as basally broad and bears, apart from the long apical seta, two slender and one minute preapical setae. Ductus bursae and spermatheca (Text-fig. 30) of the shape characteristic for the genus, the spermatheca relatively very small.

LENGTH : ♂ 3¼ mm., ♀ 4 mm. (larger than any other known species of the genus).

Nosopsyllus* (*Gerbillophilus*) *iranus attenuatus subsp. n.

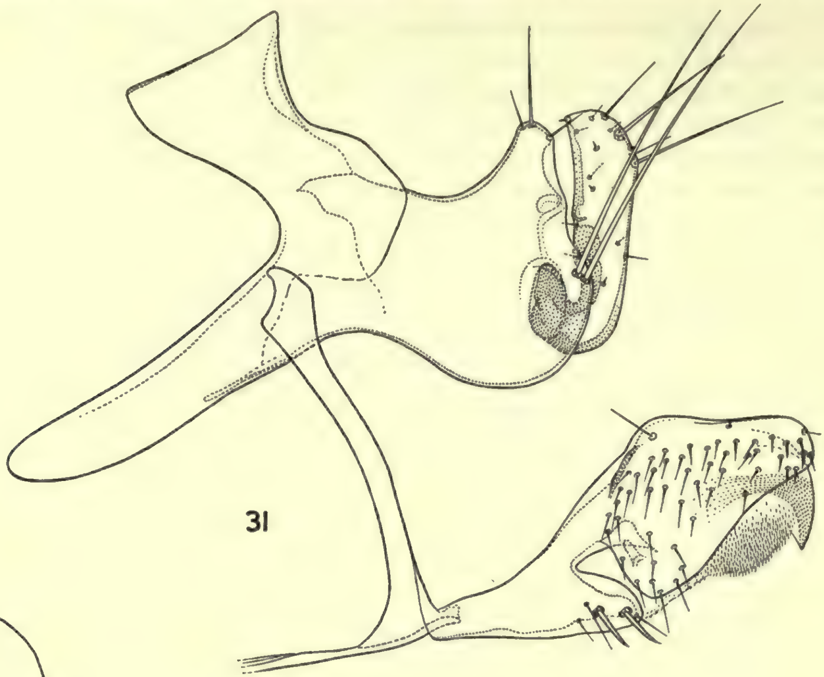
(Text-figs. 31, 32)

TYPE MATERIAL : Male holotype, female allotype and 2 ♂ paratypes from Dan, Israel, from *Meriones tristrami*, 1.iv.1954 (*M. Costa*) ; 1 ♀ paratype from Dan, from *Apodemus sylvaticus* (accidental occurrence), 1.iv.1954 (*M. Costa*) ; 2 ♂, 4 ♀ paratypes from Tel Amal, Israel, from *Meriones tristrami*, 15.ii.1953 (*M. Costa*).

DESCRIPTION : This new subspecies differs from *N. iranus iranus* Wagner & Argyropulo, 1934 (from Azerbaijan and Nakhichevan, mainly on *Meriones bogdanovi*) by the following characters : (*a*) two setae (instead of three) of the second hind tarsal segment reach well beyond the apex of the fourth segment (in the females sometimes only one), (*b*) the manubrium is relatively longer, (*c*) the fixed process of the clasper (Text-fig. 31) is much narrower than in the nominate subspecies, (*d*) the movable process is relatively shorter and does not reach much beyond the tip of the fixed process, (*e*) the apex of the distal arm of sternum IX is narrower, (*f*) the tip of the sclerotized part of the hamulus projects a little beyond the finely hirtose membranous ventral lobe. There are apparently no sharp differences between the two subspecies in the female terminal abdominal segments and genitalia (Text-fig. 32, *cf.* Text-fig. 34), but the lobe of the posterior margin of sternum VII is apparently more truncate, on the average, in ssp. *attenuatus* than in the nominate subspecies.

LENGTH : ♂ 2½–2¾ mm., ♀ 2½–3 mm.

REMARKS : *Nosopsyllus iranus iranus* was described from specimens from Belyasuvar, Azerbaijan, where it was collected in considerable numbers from nests of *Meriones bogdanovi* and a few specimens from *Rattus norvegicus* (which live there in close associated with the gerbils) (Wagner & Argyropulo, 1934 : 222). Although the original material contained specimens of both sexes, the female was not described, but in 1935 Argyropulo gives a short diagnosis and figures of that sex (pp. 163, 164,



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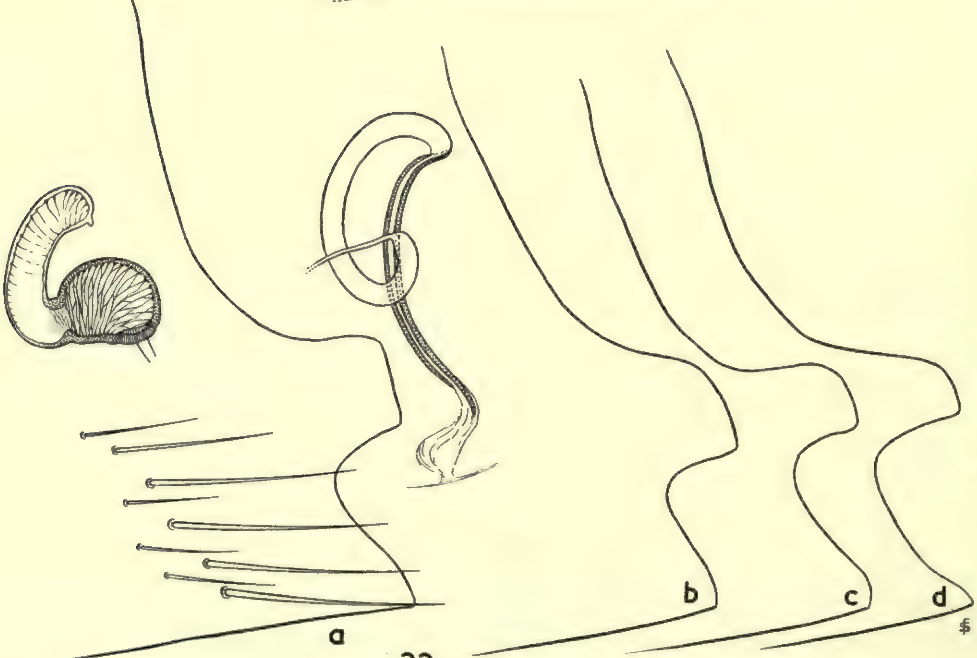

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FIGS. 31, 32. *Nosopsyllus* (*Gerbillophilus*) *iranus attenuatus* subsp. nov. 31. Clasper, sternum IX and aedeagal hamulus (holotype). 32. Sternum VII, ductus bursae and spermatheca (*a*, allotype) and outlines of sternum VII of three paratypes (*b* from Dan, *c* and *d* from Tel Amal).

figs, 34a, 36b, 37a), as well as a more complete figure of the male terminalia (figs. 6, 35 No. 1), and adds as localities Dash-Burun, Leonarkh and Nakhichevan. Argyropulo and Yavrumov (1937 : 81, 82) give additional records of *N. iranus* from the Mil'skaya steppe, Azerbaijan (Stantsia Begmanly/Araks, on *Pallasiomys erythrourus* ; Stantsia Tropicheska, on *Meriones bogdanovi*), the southern part of the Muganskaya steppe, Azerbaijan, and from the Nakhichevan A. S. S. R. (Nakhichevan, Dzhul'fa and Ordubad, on *Meriones* sp.), and they suggest that this species might be more properly placed as a subspecies of the North African *Nosopsyllus henleyi*—an opinion with which I cannot concur.

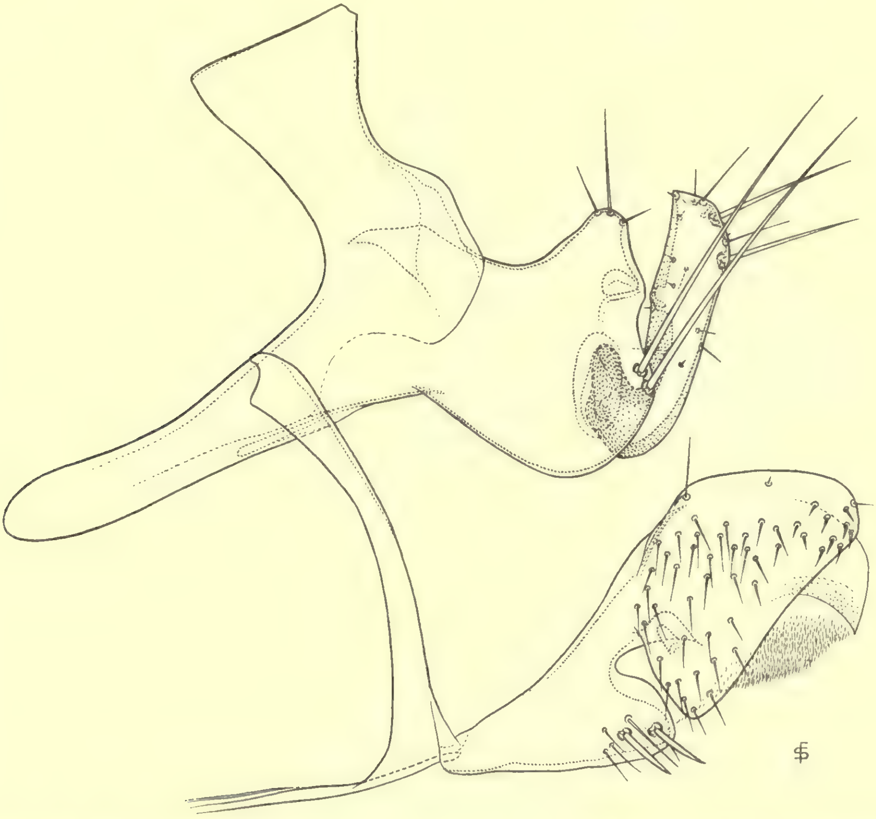


FIG. 33. *Nosopsyllus* (*Gerbillophilus*) *iranus iranus* Wagner & Argyropulo (from Kazvin, Iran). Clasper, sternum IX and aedeagal hamulus.

I have not seen any material of *N. iranus* from Transcaucasia, and have relied for the diagnosis of the new subspecies, described above, entirely on the original description and on Argyropulo's figures which have the appearance of being accurate, though somewhat sketchy.

A few years ago I received through the courtesy of Dr. G. Bouvier one male and one female of a *Nosopsyllus* collected at Kazvin, Iran, from a burrow of *Meriones persicus*, in 1955 by Dr. F. Schmid. I identify this pair tentatively as belonging to *Nosopsyllus iranus iranus* Wagner & Argyropulo and give here figures of the structures of taxonomic importance of these Iranian specimens (Text-figs. 33, 34). There are a few discrepancies between some characteristics of this pair and the published description, but they are rather small and probably come within the range of individual variation : in the Kazvin specimens (*a*) the mouthparts forming the proboscis reach to the apex of the fore trochanter (to about the middle of the trochanter in the specimens from Azerbaijan and from Israel), (*b*) the manubrium is relatively longer, (*c*) the fixed process of the clasper is somewhat narrower than in the nominate

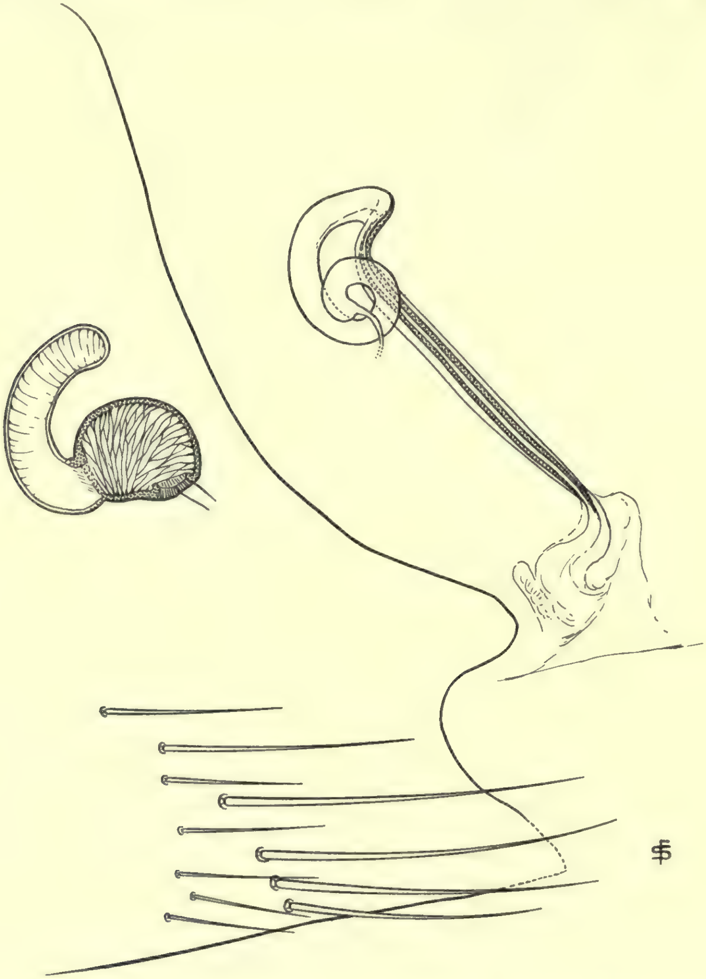


FIG. 34. *Nosopsyllus* (*Gerbillophilus*) *iranus iranus* Wagner & Argyropulo, (from Kazvin, Iran). Sternum VII, ductus bursae and spermatheca.

subspecies and its dorso-posterior margin is slightly concave, not straight as shown in Argyropulo's figures ; however, this difference may well be unimportant since it is stated in the original description that the shape of the fixed process is variable.

The species *N. iranus* is clearly a parasite of gerbils of the genus *Meriones.*

Nosopsyllus (Gerbillophilus) henleyi israelicus subsp. n.

(Text-fig. 35)

TYPE MATERIAL : Male holotype from Revivim, Israel, from *Meriones tristrami,* 25.iii.1954 (*M. Costa*).

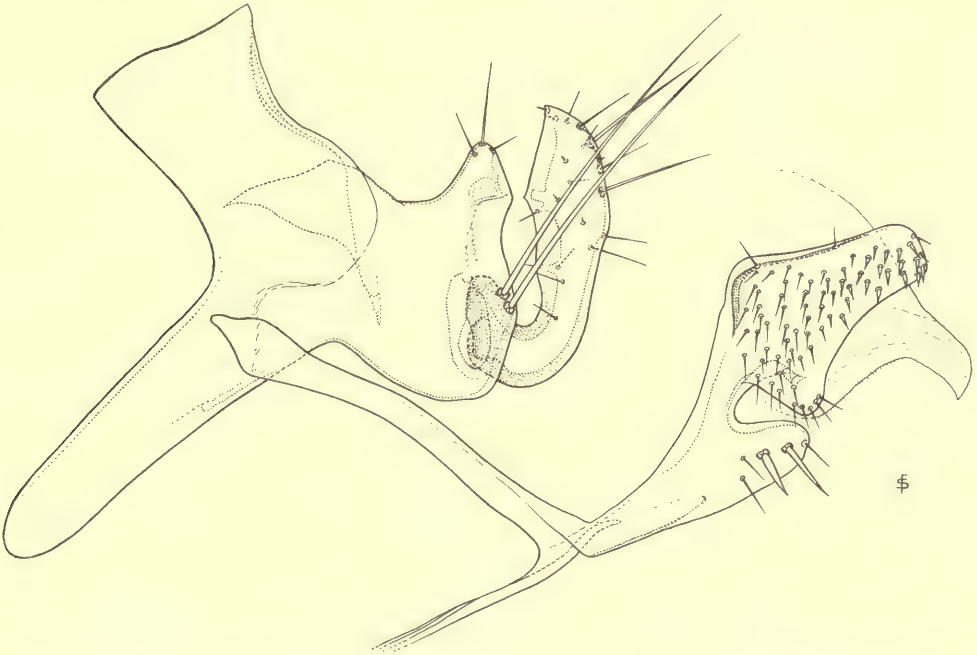


FIG. 35. *Nosopsyllus* (*Gerbillophilus*) *henleyi israelicus* subsp. nov. Clasper, sternum IX and aedeagal hamulus (holotype).

DESCRIPTION : This new subspecies is nearest related, as might be expected on geographical grounds, to *N. henleyi henleyi* (Rothschild, 1904), from Bir Victoria, about 300 miles north-west of Cairo, in the Western Desert Province of Egypt. Apart from the somewhat greater length of the upper antesensilial seta (which is almost one-third the length of the middle seta), the new subspecies differs only by details of the genitalia from the nominate subspecies, from *N. henleyi mauretanicus* (Jordan & Rothschild, 1912) (in Algeria) and from *N. henleyi oranus* (Jordan, 1931) (in Algeria and Morocco).

Male (Text-fig. 35) : Tergum VIII as in the other subspecies. Manubrium of clasper fairly broad ; fixed process almost as in the nominate subspecies ; movable process widest just above the middle, beyond which the process narrows gradually ;

the two strong setae at the posterior margin of the movable process are placed at a lower level than in the nominate subspecies. Sternum IX as in Text-fig. 35 ; as in the other subspecies the more apical setae on the distal arm are modified into small spiniforms and subspiniforms. Aedeagal hamulus with a weakly sclerotized but rather broad apical lobe.

LENGTH : ♂ 2¾ mm.

Nosopsyllus* (*Gerbillophilus*) *theodori sp. n.

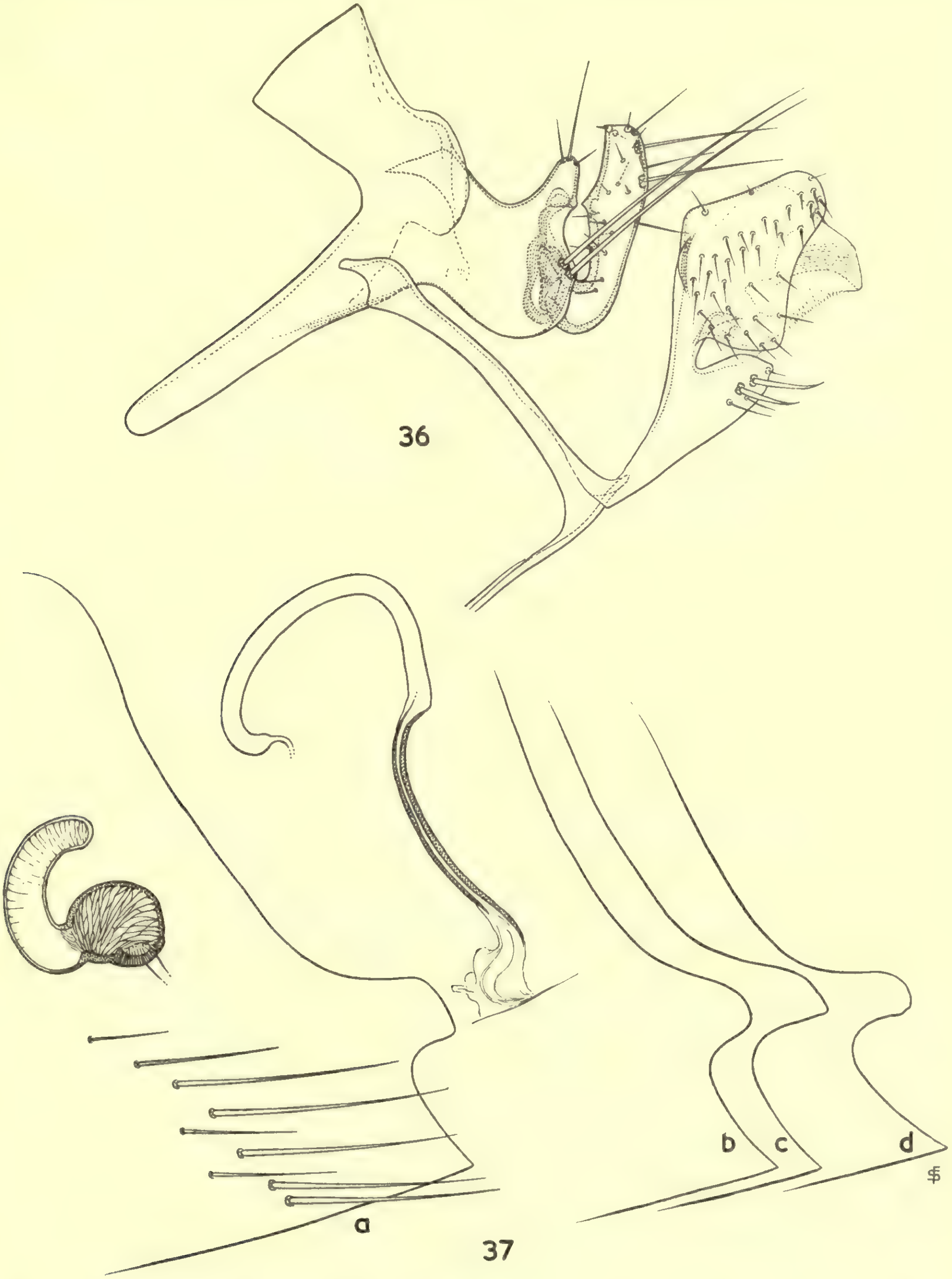
(Text-figs. 36–38)

TYPE MATERIAL : Male holotype and 1 ♂ paratype from El Hadhira, Israel, from *Meriones crassus* (holotype) and *Acomys russatus* (paratype) 20.xii.1954, (*O. Theodor*) ; female allotype and 5 ♂ 3 ♀ paratypes from Wadi Jureir, Negev, Israel, from *Meriones crassus* (allotype and 4 ♂, 2 ♀ paratypes) and *Gerbillus* (*Dipodillus*) *dasyurus* (1 ♂, 1 ♀ paratypes), 1.iv.1955 (*M. Costa*) ; 1 ♂ paratype from Wadi Nafkh, Israel, from *Gerbillus* (*Dipodillus*) *dasyurus*, 11.iv.1955 (*M. Costa*) ; 1 ♂, 1 ♀ paratypes from Raman, Trias, Israel, from *Meriones calurus* (♂) and *M. crassus* (♀), 18.iii.1956 (*M. Costa*) ; 1 ♂, 3 ♀ paratypes from Ras ez Zuweira, Israel, from *Gerbillus* (*Dipodillus*) *dasyurus* (1 ♂, 2 ♀) and *Acomys cahirinus* (1 ♀), 3.iii.1955 (*M. Costa*) ; 1 ♂ paratype from Shirta, Israel, from *Gerbillus* (*Dipodillus*) *dasyurus*, 23.xi.1957 (*M. Costa*) ; 1 ♂ paratype from Wadi Adjad, Israel, from *Gerbillus* (*Dipodillus*) *dasyurus*, 16.xi.1957 (*M. Costa*) ; 1 ♂, 1 ♀ paratypes from Beerotayim, Israel, from *Meriones crassus* (♂) and *Gerbillus* (*Dipodillus*) *dasyurus* (♀), 25.iii.1957 (*M. Costa*).

DESCRIPTION : It is difficult to assess the relationship of this and the following new species to any of the known species of the subgenus ; there are, as far as I can make out, no species which are particularly closely related to them. There is a great need for a revision of the genus *Nosospsyllus*.

Labial palp reaching to the middle of the fore trochanter. Pronotal ctenidium consisting of 20–23 spines which are distinctly longer than the pronotum. Longest seta of first hind tarsal segment subequal in length to this segment ; longest seta of second hind tarsal segment reaching to about the middle of the fifth segment, and a second seta reaching to about the apex of the fourth segment or a little beyond. The first three abdominal terga with one or two marginal spinelets each side. Spiracular fossae of terga II–VII very small, only slightly larger than the alveoli of the larger tergal setae. Upper antesensilial seta in the male about one-third the length of the middle seta, the lowest seta minute or absent ; in the female the upper seta is about one-third the length of the lower, while the latter is distinctly shorter than the middle seta.

Male (Text-figs. 36, 38) : Tergum VIII (Text-fig. 38) of medium height, with a dorso-posterior angle of about 90°. Manubrium of clasper (Text-fig. 36) straight and fairly narrow ; fixed process very narrow, the posterior margin of the clasper below it strongly sinuate ; movable process narrow and straight, with a prominent pointed angle at the middle of the anterior margin ; chaetotaxy of the movable process as

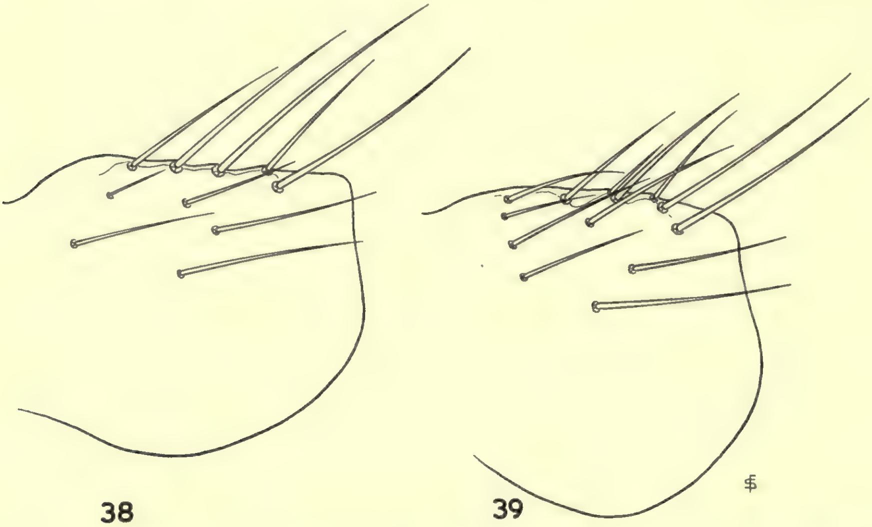


Figs. 36, 37. *Nosopsyllus* (*Gerbillophilus*) *theodori* sp. nov. 36. Clasper, sternum IX and aedeagal hamulus (holotype). 37. Sternum VII, ductus bursae and spermatheca (*a*, allotype) and outlines of sternum VII of three paratypes (*b* and *d* from Wadi Jureir, *c* from Ras ez Zuweira).

shown in Text-fig. 36. Apical part of distal arm of sternum IX broad, its dorsal margin strongly angulate ; only a few apical setae are slightly thickened, none is spiniform. Aedeagal hamulus with a non-protruding sock-shaped sclerotization, as shown in Text-fig. 36.

Female (Text-fig. 37) : Posterior margin of sternum VII with a fairly narrow but well-developed blunt lateral lobe ; chaetotaxy as in Text-fig. 37. Ductus bursae of medium length ; spermatheca as shown in Text-fig. 37.

LENGTH : ♂ 2–2½ mm., ♀ 2½–3 mm.



FIGS. 38, 39. Tergum VIII of male of : 38. *Nosopsyllus* (*Gerbillophilus*) *theodori* sp. nov. (paratype from Raman). 39 *N.* (*G.*) *pumilionis* sp. nov. (holotype).

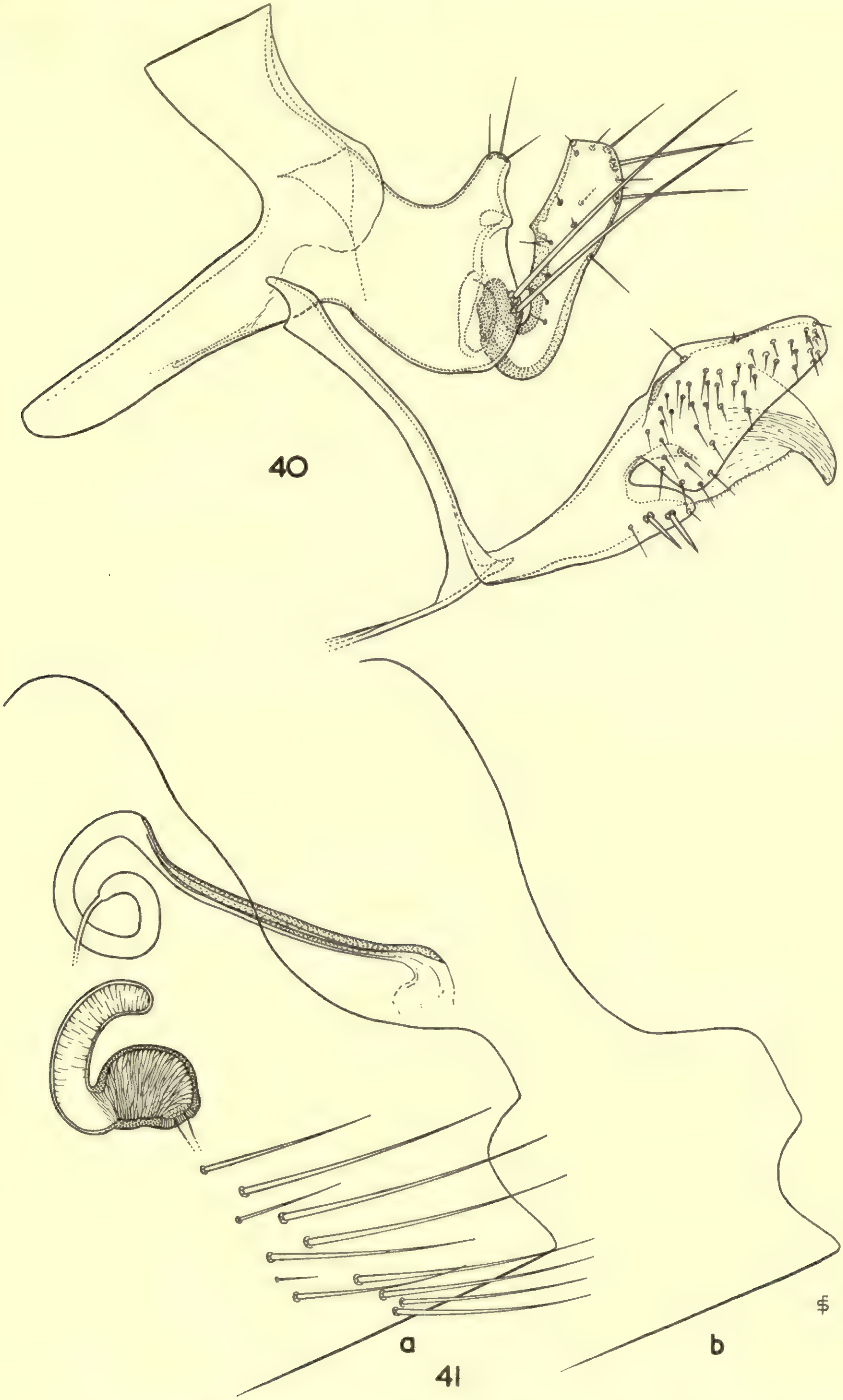
Nosopsyllus (*Gerbillophilus*) *pumilionis* sp. n.

(Text-figs. 39–41)

TYPE MATERIAL : Male holotype, female allotype and 1 ♀ paratype from Ein-Radian, Israel, from *Dipodillus nanus*, 1.ii.1953 (*M. Costa*) ; 1 ♂ paratype from Ein Radian, Israel, from *Jaculus jaculus*, 15.iv.1955 (*M. Costa*) ; 1 ♂, 3 ♀ paratypes from Tureibe, Israel, from *Meriones crassus*, 2.iv.1956 (*M. Costa*).

DESCRIPTION : A fairly close relative of *N. theodori* and, apart from somewhat larger abdominal spiracular fossae and a shorter upper antesensilial seta in the male (length of this seta only one-fourth that of the middle seta), only distinguishable from it by the modified terminal segments.

Male (Text-figs. 39, 40) : Tergum VIII (Text-fig. 39) much higher than in the previous species, its ventral margin strongly convex and the dorso-posterior angle obtuse. Manubrium of clasper (Text-fig. 40) relatively shorter and broader than in *N. theodori* ; fixed process narrow as in that species, but the margin of the clasper below it only feebly sinuate ; movable process widest in the apical half, with a sharply



FIGS. 40, 41. *Nosopsyllus* (*Gerbillophilus*) *pumilionis* sp. nov. 40. Clasper, sternum IX and aedeagal hamulus (holotype). 41. Sternum VII, ductus bursae and spermatheca (*a*, allotype) and outline of sternum VII of paratype (*b*).

pointed angle at the middle of the anterior margin ; chaetotaxy of movable process as shown in Text-fig. 40. Distal arm of sternum IX fairly narrow and straight, none of the small setae on the apical portion of this arm markedly thickened. Aedeagal hamulus with a long apical lobe, which projects far beyond the general outline of the structure (Text-fig. 40).

Female (Text-fig. 41) : Posterior margin of sternum VII with a blunt lateral lobe which is much broader than in *N. theodori*. Ductus bursae fairly long ; spermatheca as in Text-fig. 41.

LENGTH : ♂ 2½ mm., ♀ 3 mm.

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ENTOMOLOGY Vol. 8 No. 9
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British Museum (Natural History), London

Pp. 367–384; 8 *Text-figures*

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STUDIES IN *PONTANIA* (HYM., TENTHREDINIDAE)

By ROBERT B. BENSON

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1. INTRODUCTION

Two of the most formidable difficulties in studying *Pontania* O. Costa have, until recently, been to know how to define the genus and how to deal with the *viminalis* and *crassipes* complexes.

At the generic level I have recently (Benson, 1958) drawn attention to the deep " antennal hollows " (between each antennal socket and its nearest orbit) which normally serve to distinguish *Euura* and *Pontania* from *Nematus* etc., apart from their generally much smaller size, often bi-coloured stigma, and the fact that their larvae feed in galls or leaf-edge-rolls on Salicaceae instead of openly on a wider range of plants.

Euura and *Pontania* also differ biologically from each other : *Euura* larvae live in bud or stem galls ; *Pontania* in leaf galls or leaf-edge-rolls. *Euura* can normally be separated from *Pontania* by the complete absence of vein *2rm* in its forewing and in the female also usually by its characteristically short saw-sheath with an apical spine and its long rigid cerci. Unfortunately the vein *2rm* is sometimes entirely absent in *Pontania* even in both wings, but I have never seen this in other than dwarf males or obviously abnormal specimens in which there is usually some indication of the missing vein.

This treatment of *Pontania* and *Euura* differs from the one that has been applied recently to the North American fauna (Ross, 1951). In part 7(c) below I have therefore listed the North American species known to me that must be transferred from *Euura* to *Pontania*.

The *viminalis* and *crassipes* complexes are dealt with below in part 4. I have for a long time now been accumulating material of these two complexes reared from galls found on a wide range of *Salix* species. The study of this material has led me to realise :

(1) that these two complexes are not separate entities but form one continuous group ; (2) that both *Pontania viminalis* L. and *P. crassipes* Thomson are more variable and polyphagous species than was once thought and each must now embrace a number of synonyms ; and (3) that though this has led to the sweeping away of several supposed splinter species it has also confirmed the status of others and brought to light others previously unknown.

I have constructed a provisional key to the species groups of the genus for the whole world and have placed as many as possible of the described species at least tentatively into their groups (parts 2 and 7). I have also keyed the world species of the *joergenseni* group (part 3) and summarised what is known about the distribution and host range of *P. viminalis* and related species (part 4) and of *P. dolichura* (part 5). Finally I have drawn up a comparison between the arctic *Pontania* I collected at Churchill on the west of Hudson Bay in North Canada in 1956 with those I collected at Abisko, in Swedish Lapland in 1948 and 1954 (part 8).

Unfortunately except in the saws of the leaf-rollers (section A) the genitalia of this genus have not yet shown good differences at the species level.

In 1956, when I had a Leverhulme Research Fellowship to study sawflies in North America, I was able to examine many of the types of Kincaid, Marlatt, MacGillivray, and Rohwer through the kindness of the following : Dr. J. Gates Clarke (U.S. National Museum, Washington), Mr. G. P. Holland (Division of Entomology, Science Service, Ottawa), and Dr. Herbert H. Ross (Illinois Natural History Survey, Urbana). I am also specially indebted to Dr. René Malaise of Stockholm for freely letting me examine the types and other *Pontania* material in his collections from Lapland and Kamtchatka, to Dr. Kjell Ander for letting me examine the Thomson types at Lund in 1948, to Dr. F. Kühlhorn for allowing me to examine the *Potania* material, including the type of *P. hungarica* Enslin and of *Amauronematus camtschatcalis* Enslin in Enslin's collection under his care at München, and to Prof. Dr. J. de Beaumont (Lausanne) for lending me the types of *Pontania auberti* Zirngiebl and *P. enslini* Zirngiebl. Species of which I have seen types are marked below with an asterisk(*).

In addition to the *Pontania* material that my wife and I collected in North America in 1956 and in various parts of Europe during the last thirty years, many people have kindly sent me living galls from which I have been able to rear material. In particular, I am indebted to Mrs. Eva Beckett of Churchill, Manitoba, Canada, for her intelligent co-operation in gathering and sending me large quantities of fresh galls on various named *Salix* from the Canadian tundra in 1956 and 1957.

2. KEY TO SPECIES GROUPS

1 Sawsheath in lateral view at least slightly emarginate below apex, often tumid basally with an apical thorn and always shorter than hind femur. Inner anterior tibial spur often enlarged so that it is more than half as long as basitarsus. Larvae in rolled leaves or leaf-edges of *Salix* and *Populus*. Section A 2

– Sawsheath in lateral view evenly rounded below the apex and sometimes longer than hind femur. Inner anterior tibial spur not more than half as long as basitarsus. Larvae in leaf galls on *Salix* or *Populus* 3

2 (1) Antennal hollows (between each antennal socket and nearest orbit) dull and pilose *leucosticta* group

– Antennal hollows shining and glabrous . . . . . *leucapsis* group

3 (1) Underside of mesothorax usually with a glabrous pleuro-sternal line. Cenchri smaller and separated from each other by at least more than 1½ times the width of one. Hind tibial spurs often longer than apical width of tibia. Antennal hollows often glabrous. Mesoscutellum scarcely convex 4

– Underside of mesothorax pilose without glabrous pleuro-sternal line. Cenchri larger and closer together than 1½ times the width of one. Hind tibial spurs broad, curved and less than ¾ apical width of tibia. Antennal hollows dull and pilose. Mesoscutellum clearly convex. Gall bean-shaped, transected by leaf blade. (Benson 1954, fig. 8). Section B . . . . *vesicator* group

4 (3) Ovipositor rounded at apex in lateral view and often shorter than hind femur + trochantellus. Inner orbits medially often not subcarinate. Cerci in ♀ often reaching back as far as apex of sawsheath 5

– Ovipositor acute at apex in lateral view and about as long as hind femur + trochantellus. Inner orbits medially subcarinate. Cerci of ♀ not reaching back nearly as far as apex of sawsheath.

Gall coffee-bean shaped, attached to lateral leaf vein and transected by leaf so that almost as much appears above as below the leaf-blade (Benson 1954, fig. 7). Entirely parthenogenetic. Section C. . . . . . *proxima* group

5 (4) Antennal hollows glabrous, and/or frontal area clearly raised and demarcated from orbits and/or upper head covered with minute tubercles. Ovipositor shorter than hind tibia ; and, in dorsal view, sawsheath acuminate at apex even if broad basally. Galls irregular pea-or pear-shaped or cuspidate, attached to midrib on underside of leaf with usually only a small scar appearing above the leaf-blade but in some species up to ½ the gall may be above the leaf-blade. Section D . 6

– Antennal hollows pilose. Frontal area obsolete. Temples without tubercles. Ovipositor about as long as hind tibia and, in dorsal view, sawsheath is bluntly rounded apically with nearly parallel sides.

Gall vermiform, projecting more on upper than lower side of leaf, parallel with main vein and often paired (Benson, 1954, fig. 1). Section E. (monotypic) *dolichura* group

6 (5) Antennal hollows dull and pilose. (See part 3) . . . *joergenseni* group

– Antennal hollows shining and glabrous. (See part 4) . *viminalis-crassipes* group

3. THE *JOERGENSENI* GROUP WITH TWO NEW SPECIES

Key to *joergenseni* Group

1 Head above covered with tubercles and frontal area raised but not clearly defined. Sawsheath as in Benson 1958, fig. 627 2

– Head without tubercles in the frontal area which may be clearly defined . . 4

2 (1) Stigma with only apical margin infuscate. Legs reddish yellow with coxae and ± hind and middle femora infuscate. Mesopleura dull with dense coriaceous surface sculpture. Each hind ocellus about its own diameter from the occipital carina. Northern and alpine 3

– Stigma with apical half ± infuscate. Legs reddish yellow with only hind coxa infuscate. Mesopleura shining between hairs. Each hind ocellus about 1½ times its own diameter from the occipital carina. Temperate Europe. On *Salix aurita* L., *S. caprea* L., and *S. cinerea* L. . . . . *joergenseni* Enslin

3 (2) Mesothorax below evenly pilose without glabrous sterno-pleural line. Clypeus excised apically to about ½ its total length. Ovipositor shorter than hind femur without trochantellus. Northern and alpine Europe. ? On *Salix aurita* L., etc. *tuberculata* (Benson)

– Mesothorax beneath with a broad glabrous sterno-pleural line. Clypeus only slightly emarginate in front to less than ½ its total length. Ovipositor about as long as hind femur + trochantellus. Northern Canada. On *Salix arctophila* Cockerell . . . . *arctophilae* sp. n.

4 (1) Head and thorax with at least mesopleura smooth and shining . . . 5

– Head and thorax dull with continuous surface coriaceous sculpture. Arctic Northern Canada. On *Salix myrtillifolia* Anders . . . *myrtillifoliae* sp. n.

5 (4) Frontal area of head clearly defined, and, together with front lobe of mesonotum, ± dull with surface sculpture. Sawsheath in dorsal aspect 2–3 times longer than broad, and acute in lateral aspect. W. temperate N. America . . . . *devincta* MacGillivray

– Frontal area of head scarcely defined, and, together with whole of mesonotum smooth and shining. Sawsheath in dorsal aspect about as broad as long and blunt in lateral aspect. Temperate Europe. On *Salix incana* L. *kriechbaumeri* Konow

Pontania myrtillifoliae sp. nov.

COLOUR. ♀. Black with the following parts brown to yellowish-white; mouthparts, clypeus, ± hind orbits obscurely, hind corner of pronotum, tegula, legs (except for ± bases of coxae, bases of femur, apex of hind tarsus) and cerci. Wings hyaline; basal ¼ of stigma and venation at base of wings white; rest of stigma and rest of venation brown.

MICROSCULPTURE. Head (including antennal hollows) and thorax dull and densely covered with coriaceous sculpture though this becomes obsolete on the mesosternum. Abdomen transversely alutaceous.

PUBESCENCE. Head (including antennal hollows) and thorax clothed all over with pubescence, though this becomes sparser on mesosternum.

Antenna about as long as stigma + C of forewing, and 3rd segment about as long as greatest measure of eye. *Head* with frontal area not clearly defined but convex and notched in front. POL = OOL. Each hind ocellus about as far from the occipital carina as its own diameter.

Mesonotum with medial suture ± obsolete behind. *Legs* with hind tarsus about as long as tibia. Front and hind inner tibial spurs about ½ as long as basitarsus. Hind basitarsus about as long as 3 following tarsal segments. *Ovipositor* about as long as hind femur + trochantellus. Sawsheath in dorsal view about ⅔ as broad as apex of hind tibia and tapering behind (Text-fig. 5); and in lateral view broadly rounded at apex. Saw of normal gall-making type (cf. Benson, 1958, figs 642-3). *Length* 4 mm.

CANADA, Manitoba, Churchill, 6 ♀ (including holotype), 24–26.vi.1956, 2 ♀, 3–4.vii.1956. On *Salix myrtillifolia* Anderss., [*R. B. Benson*] (Holotype and paratype at Ottawa, rest of material in British Museum).

Pontania arctophilae sp. n.

♀. *COLOUR.* Black with following parts brown to yellowish-white: mouthparts, front of clypeus, ± tegula, legs (except coxae, bases of femora, and apical tarsal segments which are fuscous). Wings hyaline; stigma yellowish-white with brownish apical margin; venation brown except at base of wings and C and Sc of forewing which are brownish-white.

MICROSCULPTURE. Head and thorax above dull with rough surface which is developed into numerous small tubercles on temples and frontal region of head and on pronotum; mesopleura coriaceous in upper $\frac{2}{3}$ but below together with mesosternum impunctate and shining; abdomen shining with but inconspicuous transverse alutaceous sculpture.

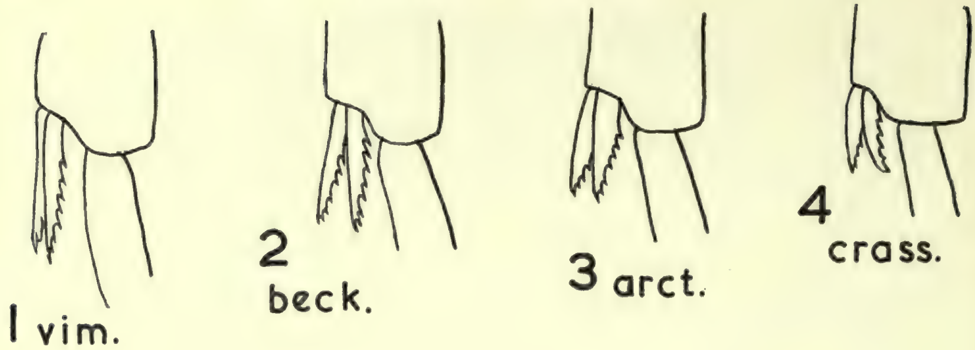
PUBESCENCE. Head including antennal hollows, meonotum and upper $\frac{2}{3}$ of mesopleura and abdomen densely and finely pubescent. Sternopleural line broadly glabrous. Mesosternum sparsely pubescent.

Antenna about as long as C of forewing and segment 3 little longer than shortest measure of an eye. *Head* with clypeus medially excised to about $\frac{1}{2}$ its depth. Frontal area clearly defined and slightly convex medially, though the front wall between this and the antennal fovea is scarcely notched. POL : OOL as i.o. : 0·65; Hind ocelli about as far from occipital carina as their own diameter. *Thorax* with medial suture of mesonotum ± obsolete behind. Hind tarsus a little shorter than tibia (0·8 : i.o.), with basitarsus about as long as 3 following tarsal segments together. Inner front and hind tibial spurs a little longer than apical width of hind tibia. *Abdomen* with ovipositor about as long as hind femur + trochantellus. Sawsheath prow-shaped in lateral view and in dorsal view is long and acuminate behind, extending about twice as far back as the short cerci (Text-fig. 6). Saw of normal gall-making type (cf. Benson, 1958, figs. 642–3). *Length* 3·5–4·5 mm. long.

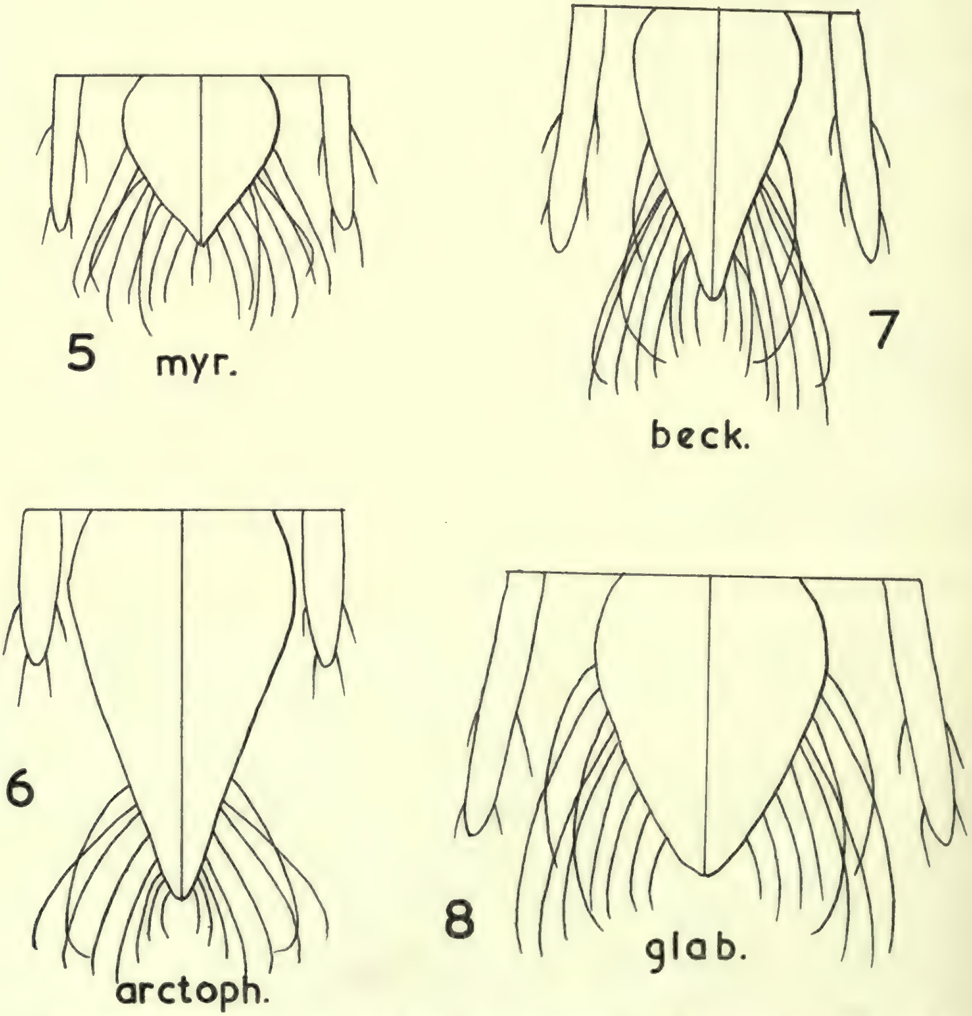
CANADA, Manitoba, Churchill, 36 ♀ 25.vi–8.vii.1956 (including holotype 8.vii.56. ovipositing on *Salix arctophila* Cockerell) [*R. B. Benson*] (Holotype and paratype at Ottawa, rest of material in British Museum).

4. THE VIMINALIS-CRASSIPES GROUP WITH TWO NEW SPECIES

Pontania viminalis L. has long tibial spurs (inner spur of hind tibia longer than apical width of tibia (Text-fig. 1)) and an irregular pea-shaped gall attached to one side of the mid-vein on the underside of the leaf with only a small scar appearing on the upper side of the leaf. *P. crassipes* Thomson on the other hand has short, often curved and scale-like, but very variable, tibial spurs at most clearly shorter than apical width of tibia (Text-fig. 4). And its pea-shaped gall attached to one side of the mid-vein on the underside of the leaf is transected by the leaf-blade so that often as much of the gall is above the leaf as below. Between these two are a number of species such as *P. arctica* MacGillivray (Text fig. 3) and *P. salicis-pisum* Thomas of North America in which these characters are intermediate; the inner hind tibial spur is more or less as long as the apical width of the hind tibia and the gall, though mainly on the underside of the leaf, may have a large and conspicuous scar on the upperside.


1 vim.
2 beck.
3 arct.
4 crass.

Figs. 1–4. Hind tibial spurs in: 1, *Pontania viminalis*; 2, *P. beckettae*; 3, *P. arctica*; and 4, *P. crassipes*.


5 myr.
7
beck.
6
arctoph.
8
glab.

Figs. 5–8. Sawsheath from above in: 5, *P. myrtillifoliae*; 6, *P. arctophilae*; 7, *P. beckettae*; and 8, *P. glabrifrons*.

Pontania viminalis (L.)

Cynips viminalis Linne, 1758, *Syst. Nat.* (10th Ed.) p. 554, No. 10.
Pontania hungarica* Enslin, 1918, *D. ent. Zt. Beih.* 1917 : 733–4, ***syn. n.*
Pontania samolad* Malaise, 1920, *Ent. Tidskr.* **40 (2–4) : 117–9, ***syn. n.***
Pontania harrisoni* Benson, 1940, *Ent. mon. Mag.* **76 : 91–4, ***syn. n.***

When I was in Swedish Lapland in 1954 I collected long series of forms of *P. viminalis* showing every gradation of stigma colouring from those with an infuscate apex to those entirely yellowish-white.

The forms with the palest stigma are not distinguishable from the type of *P. samolad* which I am therefore treating as a synonym of *P. viminalis*. Likewise we found occasional specimens of *Arge fuscipes expansa* (Klug) and of *Priophorus pallipes* (Lep.) with an entirely pale stigma ; and from high altitudes in Switzerland I have already recorded similar forms of *Amauronematus alpicola* Konow and suggested that they had some connection with the poorer development of melanin pigments at low temperatures under arctic and montane conditions.[1]

It is also clear to me now that *Pontania hungarica* and *P. harrisoni* are no more than highly coloured forms of *P. viminalis*. As I find now they are more characteristic of Central and Southern Europe (Czechoslovakia, Hungary, Jugoslavia and Asia Minor) they are probably associated with higher temperatures during some critical stage of their development, and I presume that the specimens I reared from Scottish galls were affected by the central heating of my room here ! The more extensively yellow-marked forms of *viminalis* are superficially very similar to the palaearctic *P. collactanea* (Förster) (on *Salix repens* L.) and *P. arcticornis* Konow (on *Salix phylicifolia* L. etc.) and the nearctic *P. salicis-pisum* (Thomas), *P. hospes* (Walsh) and *P. petiolaridis* Rohwer. *P. viminalis* however can be distinguished at once from all these species by its longer antennae (3rd antennal segment longer than shortest measure of an eye instead of shorter than this length).

Salix purpurea L. is the main host-plant in Central Europe but I have examined specimens reared from galls on the following species : *Salix phylicifolia* L., *S. nigricans* Smith, *S. lapponum* L., *S. hastata* L., *S. daphnoides* Vill., *S. fragilis* L., and *S. viminalis* L.

Pontania glabrifrons sp. n.

♀ *Colour.* Black with the following parts yellow to yellowish-white : gena, most of clypeus from the front, ± underside and apex of antenna, ± upper outer orbits very slightly and a fleck adjoining top of eye, ± apex of tegula, apices of femora, and tibiae and tarsi of all legs. Abdomen at extreme apex and below ± obscurely brown. Wings hyaline ; stigma uniformly yellowish-shite ; venation yellowish to brownish-white.

Antenna short, about 6/7 as long as C of forewing with segments 3, 4 and 5 subequal and longest than shortest measure of eye.

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[1] 1955. *Ent. mon. Mag.*, **91** : 105. In the same way it is evident that *Euura lappo* Malaise 1920 is a synonym of the common *Euura mucronata* Hartig. ***syn. n.***

Head glabrous and shining on face, inner orbits below, antennal hollows and the ridge above them, and the temples beside the frontal area. Surface sculpture mainly restricted to parts of the raised frontal area, the very narrow upper orbital margin, the temple above the eyes and the outer orbits which are finely coriaceous. Clypeus medially emarginate to about ½ its total length. Malar space about equal to distance between antennal sockets. Frontal area with raised lateral walls but the medial concavity is confluent with the antennal furrow in front. POL=OOL. Each hind ocellus about as far from the occipital carina as its own diameter.

Thorax shining with irregular coriaceous sculpture ± developed on the middle and front lobes of the mesonotum. Medial suture of these lobes obsolescent. Mesothorax below with normal pubescence and glabrous sterno-pleural line.

Legs normal. Inner hind tibial spur shorter than apical width of tibia (Text-fig. 2). Hind tarsus about 9/10 as long as hind tibia. *Wings* normal. *Abdomen* with coriaceous sculpture ± developed above. Ovipositor about as long as hind tibia. Sawsheath from above large, broader than apex of hind tibia, tapering behind where it reaches back a little further than the cerci ; and clothed with backwardly projecting setae (Text-fig. 8). Saw similar to that of *P. viminalis* (cf. Benson, 1958, fig. 642). Length 4–6·5 mm. ♂ as ♀ but there is more brown on the face, between the antenna and on the lower inner orbits, though the hypopygium is piceous and the stigma is brownish-white. Antenna as long as C + ½ stigma of forewing.

SWEDEN, Torne Lapmark : Torne Träsk district, 7 ♀ (including holotype) and 13 ♂ reared from galls on *Salix lanata* L., gathered in ix.1948 (*J. E. & R. B. Benson*) ; Abisko, on *Salix lanata*, 9 ♂, 41 ♀, 11–16.vi.1954, 3 ♂, 13 ♀, 17–22.vi. 1954, 1 ♂, 4 ♀, 25–30.vi.1954 (*J. E. & R. B. B.*) ; Björkliden, 6 ♀, 24.vi.1954, 1 ♀, 2 ♀, 3.vii.1954, 1 ♀, 8–9.vii.1954 (*J. E. & R. B. B.*) ; Riksgränzen, 3 ♀, 2–12.vii.1954 (*J. E. & R. B. B.*) ; Tornham, 3 ♂, 4.vii.1954 (*J. E. & R. B. B.*) ; Salkvaara, 1 ♀, 10–11.vii.1955 (*J. P. S. Pringle*) (Holotype and paratypes in the British Museum ; paratypes also at Stockholm and Helsingfors).

This species superficially resembles some of the forms of *P. viminalis* with a pale wing stigma but is distinguished at once by its short tibial spurs ; it is also distinguished from *viminalis* and all the species with short spurs by the highly polished head, especially the lower inner orbits, the ridge above the antennal sockets and the sides of the frontal area. Furthermore, in the female the broad sawsheath (Text-fig. 8) distinguishes it from any other known *Pontania*.

When my wife and I visited Swedish Lapland with Dr. Erlandsson's party after the International Entomological Congress at Stockholm in 1948 we found the galls of this species in profusion. It was the commonest and most conspicuous *Pontania* gall at Abisko that year.

Almost every plant of *Salix lanata* was adorned with them. They are large cherry-like galls attached to the mid-rib on the underside of the leaf but with a conspicuous red scar on the upperside ; and furthermore they were made even more conspicuous because each leaf that bore a gall had yellowed from the apex to the gall, though the base of the leaf remained green. Unfortunately the galls were evidently not quite mature and from over a hundred galls we only managed to rear 20 flies. When however we visited Lapland again in 1954 we had no difficulty in finding adults of this species still in profusion, mainly feeding at the catkins or ovipositing in the buds of *Salix lanata*, but never on any other *Salix*.

Pontania arctica (MacGillivray) comb. n.

Euura arctica MacGillivray, 1919, *Rept. Canad. Arct. Exped.* 1913–18, **3** : 5G, ♀.

Euura abortiva MacGillivray, 1919, *op. cit.* : 4G, (teneral ♀ specimen with unexpanded wings) ***syn. n.***

Pontania delicatula MacGillivray, 1919, *op. cit.*: 8G, ♀ ***syn. n.***

[The above three specimens reared from the same batch of galls on *Salix reticulata* L.!]

Pontania deminuta MacGillivray, 1919, *op. cit.*: 9G (teneral ♀ with unexpanded wings and asymmetrically distorted hind tarsi), ***syn. n.***

Pontania reticulatae Malaise, 1920, *Ent. Tidskr.*, **40** : 109, ***syn. n.***

A series of specimens of this species emerged in 1957 and 1958 from galls collected at Churchill, Manitoba, Canada by Mrs. Eva Beckett in September, 1956 and 1957, on the leaves of *Salix reticulata* L.[1]

The galls are pea-shaped and attached to the mid-vein near the base of the underside of the leaf, but with a large scar up to about ¼ the size of the gall visible on the upperside. I also collected adults of this species at Churchill in 1956 including some ovipositing on *S. reticulata*.

Pontania reticulatae Malaise, reared from galls on *Salix reticulata* in Swedish Lapland, is almost certainly the same species. For though a paratype of Malaise's species, which I have before me, has the surface of the frontal area of the head smooth and shining whereas the Canadian specimens all have the whole of the upper side of the head dull with dense fine coriaceous sculpture, a specimen I caught wild in Lapland in 1954 at over 2,000 feet has its head sculpture like the Canadian specimens. It should however be remarked that in Lapland and Switzerland the galls were not transected by the leaf-blade as in the Canadian race, but are attached to the underside of the leaf with only a small flat scar visible on the upper side.

The species is characterised by its dark body colour (all black except for the yellowish mouthparts, ± clypeus, temporal flecks, tegula, trochanters, apices of femora, tibiae and tarsi), yellowish-white wing-stigma, ± coriaceous head sculpture, medially channelled front part of frontal area, short antenna (shorter than distance from tegula to transverse part of Sc along C of forewing ; and 3rd segment about as long as shortest measure of an eye), short spurs (inner hind tibial spur scarcely as long as apical width of hind tibia) (Text-fig. 3), and narrow sawsheath in dorsal view with strongly backwardly projecting setae. Size 5–6 mm. Specimens from Churchill are being deposited at Ottawa.

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[1] The packets of galls on *Salix reticulata* were sent from Canada in the same parcels as packets of galls on other species of *Salix*. And when the parcels were opened in London some prepupae had already left their galls and were crawling about in the wrapping of the parcels. When, therefore, some adults of *Pontania arctica* later emerged from galls on *Salix cordifolia* Pursh. (16), *S. discolor* Muhl. (14), *S. callicarpaea* Trautv. (5) and *S. planifolia* Pursh. (2) it is assumed that they were strays. This assumption may of course be wrong. Actually only 20 emerged from galls on *S. reticulata*. Likewise although *P. beckettae* sp. n., emerged predominantly from galls on *S. planifolia* (54) there were 29 from *S. discolor* and 28 from *S. reticulata*.

Pontania beckettae sp. n.[1]

♀. Black with the following parts orange; mouthparts, labrum, clypeus, interantennal area, entire orbits as well as most of genae and temples, apical segments of antennae below, pronotum, tegula, and legs (except coxae, ± underside of femora, and extreme apices of tibial and tarsal segments) abdomen beneath and apical tergite above. Wings hyaline; venation brownish-white; stigma brownish-white, slightly infuscate apically.

Head with fine dense coriaceous surface sculpture developed above. Antennal hollows glabrous. Malar space about as long as distance between antennal sockets. Frontal crest slightly notched medially but not channelled. POL=OOL. Hind ocelli each 1½ times its own diameter from the occipital carina. Antenna only about as long as C of forewing from tegula to fork of Sc; 3rd segment shorter than shortest measure of eye.

Thorax shining with obsolescent surface sculpture, ± coriaceous on mesonotum. Medial mesonotal suture obsolescent behind. Legs with hind tarsus as long as or slightly shorter than tibia (1·0 to 0·9 : 1·0). Inner hind tibial spur slightly longer than apical width of tibia (Text-fig. 2). *Abdomen* with ovipositor about as long as femur (+ trochantellus). Sawsheath in lateral view prow-shaped, entire, reaching about twice as far beyond apex of abdomen as cerci; in dorsal view narrowly tapering behind with the apical lateral setae set outwards so that those on one side form almost a right angle with those on the other side (Text-fig. 7).

Saw typical for gall-maker (cf. Benson, 1958, fig. 642). *Length* 5–6 mm. ♂ differs from ♀ in being more extensively black on the head (the inner orbits and temples often being ± suffused with black) and pronotum (which is entirely black except for the hind angles). The stigma and wing venation are piceous. Antenna about as long as C of forewing + ½ stigma; 3rd segment about as long as the shortest measure of an eye.

CANADA, Manitoba, Churchill, 41 ♀ (including holotype), 13 ♂ ex galls on *Salix planifolia* Pursh., 29 ♀ ex galls on *S. discolor* Muhl, 1 ♀ ex gall on *S. glauca* L., 25 ♀, 3 ♂, ex galls on *S. reticulata* L. (*see* footnote on p. 377) coll. ix.1957 (*Eva Beckett*); 11 ♀, 1 ♂, 24.vi–4 vii. 1956 (*R. B. Benson*) (Holotype and ♂ and ♀ paratypes at Ottawa; rest of the material in the British Museum).

The galls of this species are very similar to those of *P. arctica*, pea-shaped and attached to the mid-vein on the underside of the leaf, with a conspicuous scar on the upperside. Of North American species this is most similar to *P. crassipes* Thomson (*see* below), and *P. salicis-pisum* Thomas (on *Salix discolor* Muhl., etc.) which, however, have very short often curved tibial spurs (the inner hind tibial spur being much shorter than the apical width of the tibia as in Text-fig. 4).

The new species is obviously closely related to the widespread northern palaearctic *P. arcticornis* Konow (on *Salix phylicifolia* L. etc.) and the two may very well later be considered to be geographical races of the same species. The dark northern forms of *P. arcticornis* that I have collected in Lapland and seen from Kamtchatka[1] are very similar in colour and structure to the new species.

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[1] I have great pleasure in dedicating this species to the distinguished field naturalist, Mrs. Eva Beckett, well known to most of the many naturalists who have visited Churchill during the last two or three decades.

But *P. arcticornis* is a smaller insect (c. 4–5 mm.) with invariably pale yellow wing stigma and venation, and longer tibial spurs (inner hind tibial spur much longer than apical width of tibia). More southern races of *P. arcticornis* are easily distinguished by their extensively yellow head with obsolete surface sculpture, deep medial channel to frontal crest, and yellow apex of antenna.

It is interesting that the main host plants of these two species, *Salix phylicifolia* and *planifolia*, should also be very closely related to each other.

Pontania crassipes (Thomson)

**Nematus crassipes* Thomson, 1871, *Hym. Scand.* : 162.

N. herbaceae* Cameron, 1875, *Proc. nat. Hist. Soc. Glasgow*, **2 : 304–7 (on *Salix herbacea* L.).

* *Pontania ora* Kincaid, 1920, *Wash. Acad. Sci. Proc.* **2** : 354, ***syn. n.***

P. atrata* MacGillivray, 1919, *Rept. Canad. Arct. Exped.* 1913–18, **3G, p. 6G (on *Salix arctica* Pall.), ***syn. n.***

P. lorata* MacGillivray, 1919, op. cit. p. 8G (on *Salix arctica*), ***syn. n.*

P. polaris* Malaise, 1920, *Ent. Tidskr.* **40 (2–4) : 112 (on *Salix herbacea* and *S. polaris* Whlb.), ***syn. n.***

P. lapponica* Malaise, 1920, l.c. (on *Salix lapponum* L.), ***syn. n.*

P. enslini* Zirngiebl, 1937, *Festschrift zum* 60 *Geburtstage von Prof. Dr. Embrik Strand*, **3 : 337. ***syn. n.***

P. arbusculae* Benson, 1941, *Proc. R. ent. Soc. Lond.* **10 (8) : 134–135 (*Salix arbuscula* L.).

P. algida* Benson, 1941, l.c. (*Salix herbacea*), ***syn. n.*

P. aquilonis* Benson, 1941, l.c. (*S. herbacea*), ***syn. n.*

In 1941 I treated this very variable species as a complex comprising two species groups distinguished by different hair patterns on the sawsheath correlated with the presence or absence of a pattern of dark flecks in the larvae. Since then I have collected and seen much more material from Scotland, Lapland, Switzerland and Canada. Among this material I have found many specimens which it is impossible to assign to either of these groups on the basis of the hair pattern on the sawsheath. Furthermore, such characters as the mean size, development of punctation, emargination of clypeus, comparative length of ovipositor and leg-segments, obsolescence of medial mesonotal suture, appear to vary from colony to colony and to be of little account.

When we further investigate the black flecking of the larvae we find that there has been confusion between larvae and prepupae ; larvae are greenish-white and develop a pattern of black flecks in later stages (cf. Benson, l.c., fig. 3) ; but prepupae on the other hand are brownish-grey in colour with the black flecks obsolete or at most indicated by tiny specks (cf. Malaise, 1920, l.c., fig. 13a).

The chief characters for separating this species from other members of the *viminalis-crassipes* group are its short curved tibial spurs (the inner hind spur much shorter than the apical width of the tibia), its short antenna (in ♀ only about as long as C of forewing from tegula to fork of Sc ; in ♂ little longer than C) its almost entirely black head and body colour and colourless stigma. The pea-shaped galls are attached to the mid-vein of the leaf and transected by the leaf blade so that $\frac{1}{3}$ to $\frac{1}{2}$ of the gall is above the leaf. Its host-plant range is now known to include the following arctic willows : *Salix herbacea* L., *S. polaris* Whlb., *S. arctica* Pall., *S. retusa* L., *S. arbuscula* L., *S. mysinites* L.[1] and *S. lapponum* L.

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[1] Described as **Amauronematus camtschatcalis* Enslin, 1927. *Ann. Mus. Zool. Acad.*, Leningrad, **26** : 376, = *Pontania arcticornis* Konow 1904, ***syn. n.***

5. ***Pontania dolichura*** (Thomson)

**Nematus dolichurus* Thomson, 1871, *Hym. Scand.* : 164.
N. femoralis* Cameron, 1875, *Proc. Nat. Hist. Soc. Glasgow*, **2 : 295.
Pontania dolichura (Thomson) Konow, 1890, *Deuts. ent. Z.*, **34** : 245.
P. sp. cfr. *pedunculi* Hartig, Malaise, 1931, *Arkiv. för Zoolog.* **23**A (8) : 35.
P. femoralis Cameron, Malaise, 1931, l.c. (Gall).
P. robbinsi* Benson, 1935, *Trans. ent. Soc. Lond.* **83 : 26.
Nematus (*P.*) *dolichura* (Thomson) Benson, 1954, *J. Soc. Brit. Ent.* **4** (9) : 208, fig. 1 (Gall).

The characteristic galls of this species in North Britain and Scandinavia are mainly on *Salix phylicifolia* L. and *S. nigricans* Smith and occasionally on *S. arbuscula* L., *S. lapponum* L., *S. myrsinites* L. and *S. lanata* L. On the European continent this is a familiar species on *Salix purpurea* L., on the sand dunes on the north coast of Holland and Germany and in alpine valleys in Switzerland and Austria, where in addition to the *Salix* already mentioned it has also been recorded from *Salix glabra* Scop., *S. incana* Schrank and *S. retusa* L. (Dittrich, 1924, *Zoologica* Stuttgart, **61** : 623 and fig. 37). Malaise (l.c.) records its galls from Kamtchatka on *S. sachalinensis* R. Schmidt, but whereas the adult specimens in his collection named " cfr. *femoralis* Cameron " proved to belong to *P. arcticornis*, his *P. dolichura* bore a label, " cfr. *pedunculi* ".

At Churchill on Hudson Bay in Canada I found the galls commonly in June and July, 1956, on *Salix planifolia* Pursh.

6. THE SPECIES IN THEIR GROUPS

Section A

i. *leucosticta group*

**acuminata* Marlatt, E. nearctic.
**acutiserra* Lindqvist holarctic.
**anglica* (Cameron), palaearctic.
**auberti* Zirngiebl, N. Africa.
**borealis* (Marlatt), N. nearctic.
**coriacea* (Benson), holarctic.
cressoni Marlatt, W. nearctic.
leucosticta (Hartig), Europe.
pallicornis (Norton), E. nearctic.
parva (Cresson), W. nearctic.
**piliserra* (Thomson), Europe.
**populi* Marlatt, E. nearctic.
**purpureae* (Cameron), Europe.
scotaspis (Förster), Europe.
**sibirica* Malaise, E. Siberia.
**terminalis* Marlatt, E. nearctic.
**tundra* Kincaid, N. nearctic.

ii. *leucapsis group*.

**agama* Rohwer, nearctic.
**albopicta* Malaise, E. Siberia.
bozemani Cooley, nearctic.
excavata* Marlatt, holarctic (= **apicifrons* Malaise, **carinifrons* Benson, **destricta* MacGillivray. and **megacephala* Rohwer, **syn. n.)
**leavitti* Rohwer, nearctic.
leucapsis (Tischbein), palaearctic.
nevadensis (Cresson), W. nearctic.
**peninsularis* Kincaid, Alaska.

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[1] Frequent on *Salix myrsinites* at Inchnadamph in Sutherland, Scotland in June, 1958.

*_pepii_ Ross, W. nearctic.
*_populla_ Ross, W. nearctic.
*_puella_ (Thomson), Europe.
*_robusta_ Marlatt, E. nearctic.

unplaced species (_leucosticta_ or _leucapsis_ group)

leucostoma Rohwer, W. nearctic.
mariana Ross, W. nearctic.
marlatti Ross, W. nearctic.
melanosoma Rohwer, W. nearctic.
mellina (Cresson), W. nearctic.
pectoralis Marlatt, E. nearctic.

Section B

iii. _vesicator group._

*_bruneri_ Marlatt, W. nearctic.
*_pustulator_ Forsius, N. Europe.
vesicator (Bremi), Europe.
_sp._ Japan.

Section C

iv. _proxima group._

*_bridgmanii_ (Cameron), Europe.
proxima (Lepeletier), Europe introduced into N. America
*_triandrae_ Benson, Europe.

Section D

v. _joergenseni group_ (see part 3 above)

*_arctophilae_ Benson sp. n., N. nearctic.
devincta MacGillivray, E. nearctic.
joergenseni Enslin, Europe.
kriechbaumeri Konow, Europe.
*_myrtillifoliae_ Benson sp. n., N. nearctic.
*_tuberculata_ (Benson), Europe.

vi. _viminalis-crassipes_ group (see part 4 above)

arcticornis Konow, N. palaearctic.
*_arctica_ (MacGillivray), arctic, circumpolar.
*_beckettae_ Benson sp. n., N. nearctic.
brachycarpae (Rohwer), W. nearctic.
californica Marlatt, California.
*_consors_ Marlatt, E. nearctic.
*_crassipes_ (Thomson), arctic circumpolar.
*_glabrifrons_ Benson sp. n., arctic Europe.
gracilis Marlatt, E. nearctic.
hoppingi (Ross), W. nearctic.
hospes (Walsh), W. nearctic.
lucidae Rohwer, E. nearctic.
pedunculi (Hartig), Europe.
petiolaridis Rohwer, E. nearctic.
salicis-pisum (Thomas), E. nearctic.
viminalis (L.), Europe.

Section E

vii. _dolichura group._

*_dolichura_ (Thomson), N. holarctic.

Unplaced species

atriventris Marlatt, W. nearctic.
daedala MacGillivray, E. nearctic.
dedecora MacGillivray, E. nearctic.
placenta Norton, Labrador.
stipata MacGillivray, Alaska.
truncata, Marlatt, California.
utensis Rohwer, W. nearctic.

7. CHANGES IN THE NORTH AMERICAN CATALOGUE

Under this heading I am tabulating the changes put forward in this present paper to the North American list of _Pontania_ (Ross, 1951), including here the results of some type studies I made in N. America in 1956 and of some collecting on the Canadian tundra the same year :

(a) _Species to be excluded from Pontania_ :

*_Pontania amentivora_ Rohwer =_Amauronematus amentivorus_ (Rohwer), **comb. n.**
*_P. delicatula_ MacGillivray = *_P. arctica_ (MacGillivray), **_syn. n._**
*_P. deminuta_ MacGillivray = *_P. arctica_ (MacGillivray), **_syn. n._**

P. devincta* MacGillivray = **P. excavata* Marlatt, ***syn. n.*
P. glinka* Kincaid = *Nematus glinkus* (Kincaid), ***comb. n.*
P. hyalina* (Norton) = *P. proxima* (Lepeletier), ***syn. n.*
P. megacephala* Rohwer = **P. excavata* Marlatt, ***syn. n.*
P. popofiana* (Kincaid) = *Nematus popofianus* (Kincaid) ***comb. n.*
P. quadrifasciata* (MacGillivray) = *Amauronematus quadrifasciatus* (MacGillivray), ***comb. n.*

(b) *Species transferred to Pontania from Euura* :

Euura abortiva* MacGillivray = **Pontania arctica* (MacGillivray), ***syn. n.*
**E. arctica* MacGillivray.
**E. borealis* (Marlatt).
**E. bruneri* (Marlatt).
E. californica (Marlatt).
E. hoppingi Ross.
E. hospes Walsh.
**E. ora* (Kincaid) = **Pontania crassipes* Thomson.
**E. resinicola* (Marlatt).
**E. salicis-pisum* (Thomas).

(c) *Species to be added to Pontania* :

Pontania acutiserra* Lindqvist, 1948, *Not, ent.*, **28 : 66–9. Holarctic.
**P. arctophilae* Benson, sp. n. (see above). Arctic Canada.
**P. beckettae* Benson, sp. n. (see above). Arctic Canada.
P. coriacea* (Benson), 1953, *Ent. mon. Mag.* **89 : 150–1. Holarctic.
**P. crassipes* (Thomson) (see above). Holarctic.
**P. dolichura* (Thomson) (see above). Holarctic.
**P. myrtilifoliae* Benson, sp. n. (see above). Arctic Canada.
**P. peninsularis* Kincaid from *Amauronematus* (though **Pontania islandica* Kincaid, given as a synonym of this species, is really distinct and a true *Amauronematus*).
P. proxima (Lepeletier), 1825, *Mon. Tenthr.*, p. 67 = *P. hyalina* (Norton), ***syn. n.*** Europe introduced into N. America with its host-plant *Salix fragilis* L.

8. ARCTIC SPECIES OF CANADA AND LAPLAND COMPARED

Of the 9 species of *Pontania* I found at Churchill on the west coast of Hudson Bay, lat. about 58° 44′ N., in N. Canada in June–July, 1956, and the 10 I found at Abisko, on the Torne Träsk, lat. about 68° 21′ N. in Swedish Lapland in 1948 and 1954, 5 species were common to both areas ; all of these 5 I have also found in Switzerland and 3 in Britain. Though I failed to find *P. coriacea* at Churchill, my wife collected specimens of it at Lake Louise, Alberta ! Churchill is on the edge of lowland tundra and all 9 species were found actually on the tundra ; Abisko though much further north is yet situated in birch forest with mountain tundra only above about 2,000 feet altitude.

	Churchill (N. Canada)	Abisko (Lapland)	Also in Britain	Also in Switzerland
acutiserra	+	+	+	—
coriacea	—	+	+	+
tundra	+	—	—	—
excavata	+	+	+	+
arctophilae	+	—	—	—
myrtillifoliae	+	—	—	—
tuberculata	—	+	+	+
arctica	+	+	—	+
arcticornis	—	+	+	+
beckettae	+	—	—	—
crassipes	+	+	+	+
glabrifrons	—	+	—	—
viminalis	—	+	+	+
dolichura	+	+	+	+

This high holarctic proportion of species represented in the Abisko region (60%) and in the Churchill region (nearly 55%) is comparable with the 60% of circumpolar species in the Canadian arctic butterfly fauna (Freeman, 1958), but does not appear at species level in the *Salix* to which the *Pontania* spp. are attached, possibly partly because botanists have not yet accepted generally the zoological concept of the geographical subspecies. The 19 species of *Salix* found in the Churchill district were listed by Ritchie (1956) as follows : *reticulata* L., *vestita* Pursh. var. *erecta* Anderss., *anglorum* Cham., *arctophila* Cockerell, *glauca* L., with var. *acutifolia* (Hook) Schneider, *desertorum* Richards, *callicarpaea* Trautv., *cordifolia* Pursh. var. *tonsa* Fern., *brachycarpa* Nutt. var. *antimima* (Schneider) Raup., and var. *mexiae* Ball, *myrtillifolia* Anderss., *adenophylla* Hook., *calcicola* Fern. & Wieg., *alaxensis* (Anderss) Cov., *candida* Flugge, *bebbiana* Sarg., *pedicellaris* Pursh. var. *hypoglauca* Fern., *planifolia* Pursh., *pellita* Anderss., and *arbusculoides* Anderss.

Only two of these, *reticulata* and *glauca*, occur also at Abisko. Apart from these the 12 *Salix* recorded from the Abisko district by Fries (1919) are : *pentandra* L. (introduced), *nigricans* Smith, *phylicifolia* L., *arbuscula* L., *hastata* L., *lapponum* L., *lanata* L., *myrsinites* L., *herbacea* L. (holarctic but absent from Churchill district) and *polaris* Wg. 25% of the Abisko *Salix* are thus holarctic and nearly 17% occur at Churchill. And all except *lanata* and *polaris* of the Abisko species occur also in central Europe ; and all except *glauca* and *polaris* in Britain.

If, however, these *Salix* spp. are placed in their species-groups as given by Rehder (1940) it is found that 5 of the 9 groups represented at Abisko (56%) occur also among the 8 at Churchill (where they form 63%).

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BY

D. J. WILLIAMS

Commonwealth Institute of Entomology

BRITISH MUSEUM
13 MAR 1960
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Pp. 385–430: 19 *Text-figures*

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THE PSEUDOCOCCIDAE (COCCOIDEA: HOMOPTERA) OF THE SOLOMON ISLANDS

By D. J. WILLIAMS

INTRODUCTION

THE Solomon Islands stretch for nearly 1000 miles between lat. 5° and 12° S. and long. 154° and 165° E. and in the present report the island of Bougainville is considered along with them. The total land area is about 17,000 square miles, and the terrain is mountainous rising to an elevation of 8,000 ft. in Guadalcanal. Notwithstanding their extent and individual size, and the promise of a rich insect fauna in the natural vegetation, the amount of collecting which has been done so far in the islands is not large compared with that on many other smaller island groups in the Pacific, and as far as the Coccoidea are concerned, and the Pseudococcidae in particular, has been extremely small.

HISTORY

In 1929 Cockerell described *Trionymus malaitensis* on the basis of a collection made by H. S. B. Young. One year later Laing added two species *Heterococcus painei* and *Neosimmondsia hirsuta* based on specimens taken by R. H. Paine and H. W. Simmonds respectively and in 1934 Green described a further species *Pseudococcus leveri* collected by R. A. Lever. Thus up till the present time, with the addition of a cosmopolitan species, our knowledge of the family in this area was confined to five species in four genera.

The present report is based mainly on a study of extensive collections made in the islands by E. S. Brown between 1954 and 1956 and on material collected by B. A. O'Connor. Sixteen species are now added to this list, twelve of them are new and their taxonomic treatment has necessitated the recognition of seven new genera.

There is little known so far of the Coccoidea of New Guinea but collections at hand indicate that there is a closer relationship of the fauna of the Solomon Islands to that of the islands of the Bismarck Archipelago than to the fauna of the main island of New Guinea. In fact none of the Solomon Islands' genera of Pseudococcidae has yet been found in New Guinea, apart from the cosmopolitan genera, but further collecting may prove otherwise. However, *Mutabilicoccus simmondsi* (Laing) described from New Britain is now known throughout the Solomon Islands and specimens are also at hand from Tartua in New Ireland. Another species, *Palmicola browni* sp. n. has been collected from most of the Solomon Islands and specimens are at hand from the Admiralty Islands and New Britain.

GEOGRAPHICAL DISTRIBUTION

The collection records of the Pseudococcidae show the species to be distributed as follows :—

DISTRIBUTION LIST OF SOLOMON ISLANDS' PSEUDOCOCCIDAE

	Bougainville	Santa Ysabel	New Georgia	Malaita	Guadalcanal	San Cristobal	Other Islands	Other Localities
*Criniticoccus ficus**						×		
*tectus**				×				
*theobromae**	×	×						
Dysmicoccus brevipes					×			Cosmopolitan
*Exilipedronia sutana**					×			
Ferrisiana virgata	×							Cosmopolitan
Laingiococcus painei					×	×	×	
*Laminicoccus cocois**							×	
Maculicoccus malaitensis		×		×	×	×	×	
*Mollicoccus guadalcanalanus**					×			
*Mutabilicoccus artocarpi**				×				
simmondsi			×	×	×	×	×	New Britain, New Ireland
Neosimmondsia hirsuta				×		×		
*Palmicola browni**	×				×	×	×	New Britain, Admiralty Is.
*Paraputo kukumi**					×			
leveri				×	×	×	×	Fiji
*Pedrococcus tinahulanus**					×			
Planococcus citri	×	×	×	×	×	×	×	Cosmopolitan
Pseudococcus adonidum					×			Cosmopolitan
*solomonensis**		×		×				
*Trionymus chalepus**					×			

* Described as new.

Moreover, it is interesting that *Paraputo leveri* (Green) is now known from Fiji and *Laminicoccus cocois* sp. n. is very close to *L. vitiensis* (Green & Laing), another Fijian species.

From the many species collected by E. S. Brown in the Solomon Islands it is evident that the mealybugs constitute a large part of the endemic fauna and from our scant knowledge it seems safe to state that the same is true for the remainder of the Pacific area. Fijian collections show a large endemic mealybug fauna and Zimmerman (1948) shows that the mealybugs appear to be the only group of Coccoidea to have developed an endemic complex in Hawaii. Serious collecting in the lesser known areas of the Pacific should prove both interesting and valuable and is essential before a comprehensive conclusion on distribution can be drawn.

Of the new genera discussed below, *Mutabilicoccus* is known from the Bismarck Archipelago, the genus *Laminicoccus* from Hawaii and Fiji and *Palmicola* with a wider distribution will probably be found throughout the Pacific ; material is at hand from as far afield as Malaya.

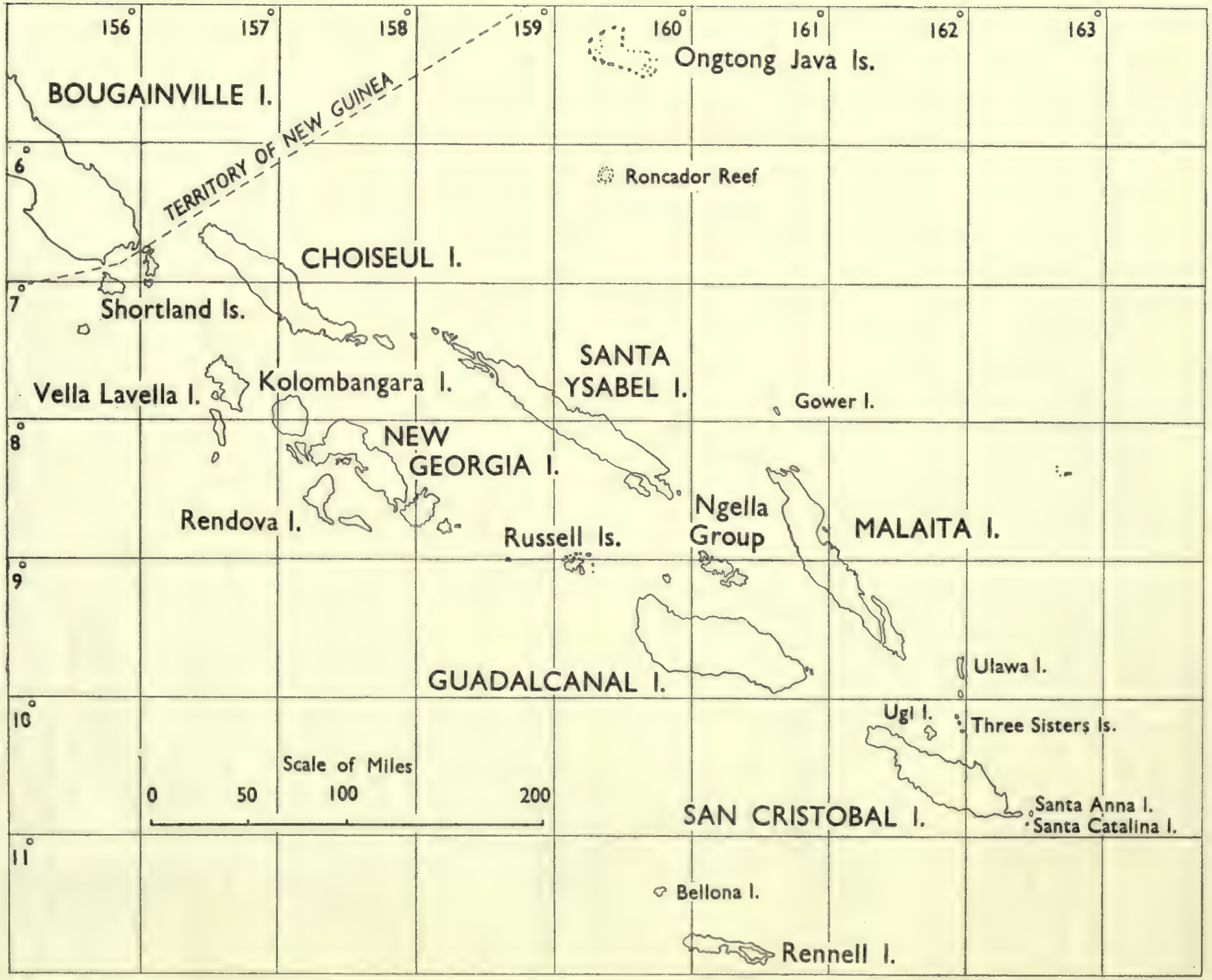
The species discussed here are probably only a small proportion of those still to be discovered. It is unfortunate that none have been collected in Choiseul, the least known of the larger islands, or in the Santa Cruz Islands.

Unless otherwise stated all the material has been collected by E. S. Brown.

The types of all new species are deposited in the British Museum (Natural History).

KEY TO GENERA

1		Legs with a denticle on the claw, either well developed or small at apex, cerarii absent	2
–		Legs without a denticle on the claw, cerarii present or absent	3
2	(1)	Antennae 9-segmented, quinquelocular pores numerous on dorsum and venter, with a transversely elliptical circulus within the borders of the fourth segment, tubular ducts on dorsum absent, anal ring situated twice its diameter from apex of body	*Laingiococcus* Morrison
–		Antennae 7-segmented, without quinquelocular pores on dorsum and venter, circulus absent, tubular ducts on dorsum larger in diameter than multilocular disc pores, anal ring situated at apex of body	*Mollicoccus* gen. n.
3	(1)	Anal ring situated one or more times its diameter from apex of body, antennae 6-segmented	4
–		Anal ring situated at apex or at most a short distance from apex of body, antennae 6–8-segmented.	5
4	(3)	Cerarii present, each with numerous setae	*Paraputo* Laing
–		Cerarii absent	*Neosimmondsia* Laing
5	(3)	With a distinct anal bar present either separate or joined to dorsal sclerotization of anal lobes	6
–		Without an anal bar or if there is any sclerotization on ventral anal lobes it is in the form of a triangular or quadrate plate	9
6	(5)	Each cerarius with 2 conical setae which, except on anal lobes are all of similar size, dorsal setae small and slender	*Planococcus* Ferris
–		Not with this combination of characters	7
7	(6)	Cerarii recognizable or unrecognizable, cerarian setae of varying sizes either similar or different in shape to dorsal setae, not borne on sclerotized plates	*Mutabilicoccus* gen. n.
–		Cerarii borne on sclerotized plates	8
8	(7)	With 18 pairs of cerarii, cerarian setae slender with some dorsal setae same size as cerarian setae	*Exilipedronia* gen. n.
–		With 17 pairs of cerarii, cerarian setae stout, dorsal setae of different size to cerarian setae	*Pedrococcus* Mamet
9	(5)	With 14–17 pairs of cerarii	10
–		With 1 or 2 pairs of cerarii	14
10	(9)	With a concentration of minute ducts around the posterior coxae	*Palmicola* gen. n.
—		Without a concentration of minute ducts around the posterior coxae . .	11
11	(10)	With some cerarii with more than 5 setae	12
—		With no cerarii with more than 5 setae	13
12	(11)	Cerarii borne on sclerotized plates, all dorsal setae shorter than anal ring setae	*Laminicoccus* gen. n.


156°
157°
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6°
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11°
BOUGAINVILLE I.
TERRITORY OF NEW GUINEA
Ongtong Java Is.
Roncador Reef
CHOISEUL I.
Shortland Is.
SANTA YSABEL I.
Vella Lavella I.
Kolombangara I.
Gower I.
NEW GEORGIA I.
Ngella Group
MALAITA I.
Rendova I.
Russell Is.
GUADALCANAL I.
Ulawa I.
Ugi I.
Three Sisters Is.
Scale of Miles
0
50
100
200
SAN CRISTOBAL I.
Santa Anna I.
Santa Catalina I.
Bellona I.
Rennell I.

FIG. 1. Map of Solomon Islands.

— Cerarii not borne on sclerotized plates except possibly on anal lobes, most dorsal setae as long as or longer than anal ring setae . . *Criniticoccus* gen. n.
13 (11) With oral rim ducts on dorsum . . . . . . *Pseudococcus* Westwood
— Without oral rim ducts on dorsum . . . . . . *Dysmicoccus* Ferris
14 (9) With some dorsal ducts enlarged, each with orifice surrounded by a sclerotized area bearing setae . . . . *Ferrisiana* Takahashi
— Without such ducts 15
15 (14) Ventral surface with numerous minute disc pores, dorsal setae stout, legs stout *Maculicoccus* gen. n.
— Ventral surface without minute disc pores, dorsal setae slender, legs slender *Trionymus* Berg

DESCRIPTION OF SPECIES

Criniticoccus gen. n.

Type of genus *Criniticoccus ficus* sp. n.

Recognition characters. Pseudococcidae with 8-segmented antennae; legs normal without a tooth on claw; anterior and posterior ostioles present; cerarii numbering 17 pairs, these with up to 12 conical setae especially at anterior and posterior ends, some of them rarely with less than 5 and always accompanied by auxiliary setae, anal lobe cerarii each with a group of up to 7 conical setae or with but 2 setae; dorsum with long setae, in the known species these as long as or longer than anal ring setae. Tubular ducts of oral collar type always present on venter and usually present on dorsum although in the type species there is but 1 pair, ducts of oral rim type present around margin in one species; multilocular disc pores present around vulva; ventral side of anal lobes with an area of sclerotization as large as or larger than anal ring; circulus well developed lying across fold of fourth and fifth segments; anal ring cellular, apical or at most removed a very short distance from apex, with 6 setae.

Notes. This genus comes very close to the genus *Dysmicoccus* Ferris but differs in a few characters which seem to warrant the erection of a new genus. There are always some cerarii with 5 or more setae and one species has a few oral rim ducts on the dorsum, characters never found in *Dysmicoccus*. The setae seem to be much longer than normally found in *Dysmicoccus* and in each case they are as long as or longer than the anal ring setae.

The three species included in the genus may be separated by the following key :—

1. Anal lobe cerarii each with 2 conical setae 2
– Anal lobe cerarii each with about 7 conical setae of various sizes, dorsal surface with numerous setae and usually with only a single tubular duct near each tenth cerarius . . . . *ficus* sp. n.
2. With a few oral rim ducts around the anterior margin, circulus very large *theobromae* sp. n.
– Without oral rim ducts on dorsal surface but with number of small oral collar ducts around entire margin and a few in midregion . . . . *tectus* sp. n.

Criniticoccus ficus sp. n.

(Text-fig. 2)

HABIT. Collected between the fruits of *Ficus* sp., tended by *Iridomyrmex myrmecodiae*, SAN CRISTOBAL, Kira Kira, 21.iv.1955 and 20.vii.1956.

RECOGNITION CHARACTERS. A broadly oval species measuring about 2·7 × 2·1 mm. Antennae 8-segmented. Legs normal, femur rather stout, hind femur and tibia with translucent pores. Circulus well developed. Ostioles with inner edges of lips sclerotized and lips with a few setae and trilocular pores. Anal ring with 6 setae which are about the same length as its diameter. Cerarii numbering 17 pairs, anal lobe cerarii each with 7–10 conical setae of different sizes, with a few trilocular pores surrounded by a faint sclerotized area. Penultimate cerarii each with about 10–13 conical setae of various sizes on a lightly sclerotized area, the other cerarii diminishing in size anteriorly, each with 5–10 conical setae, the usual number being 7. Dorsal setae numerous, mainly long and slender and about the size of anal ring setae. Trilocular pores rather numerous. Simple circular pores present nearly the same size as a trilocular pore, numerous. A single tubular duct with oral collar usually present near each tenth cerarius.

Ventral surface with a large area of sclerotization on anal lobes, larger in area than anal ring and containing numerous setae and a pair of long stout apical setae. Ventral setae slender, not so long as those on dorsum. Multilocular disc pores arranged around the vulva only, there being about 8–12 anterior to the vulva and about 5 posteriorly. Tubular ducts in transverse rows on segments 6 and 7, and also in groups lateral to the multilocular disc pores on segment 8, there being also one or two ducts to each segment anteriorly and on head, the lateral ducts tending to be slightly larger than those in the transverse rows. Trilocular pores and simple circular pores rather numerous and evenly distributed.

Criniticoccus tectus sp. n.

(Text-fig. 3)

HABIT. Abundant on the fruits of *Theobroma cacao* tended by *Iridomyrmex myrmecodiae* and always covered by a carton, MALAITA, Su'u, 1.vi.1955.

RECOGNITION CHARACTERS. Shape broadly elliptical measuring 3·0 × 2·5 mm., anal lobes well developed. Antennae 8-segmented. Legs normal, posterior pair with numerous translucent pores on each femur and tibia. Circulus large and well developed. Ostioles present with one or two long setae and a few trilocular pores on each lip. Anal ring with 6 setae only slightly longer than its diameter. Cerarii numbering 17 pairs; anal lobe cerarii with two large conical setae and numerous trilocular pores surrounded by an area of sclerotization; anterior cerarii each with 2–8 conical setae of various sizes and 1 or 2 auxiliary setae surrounded by a few trilocular pores, the smaller cerarii tending to occupy the thorax and anterior

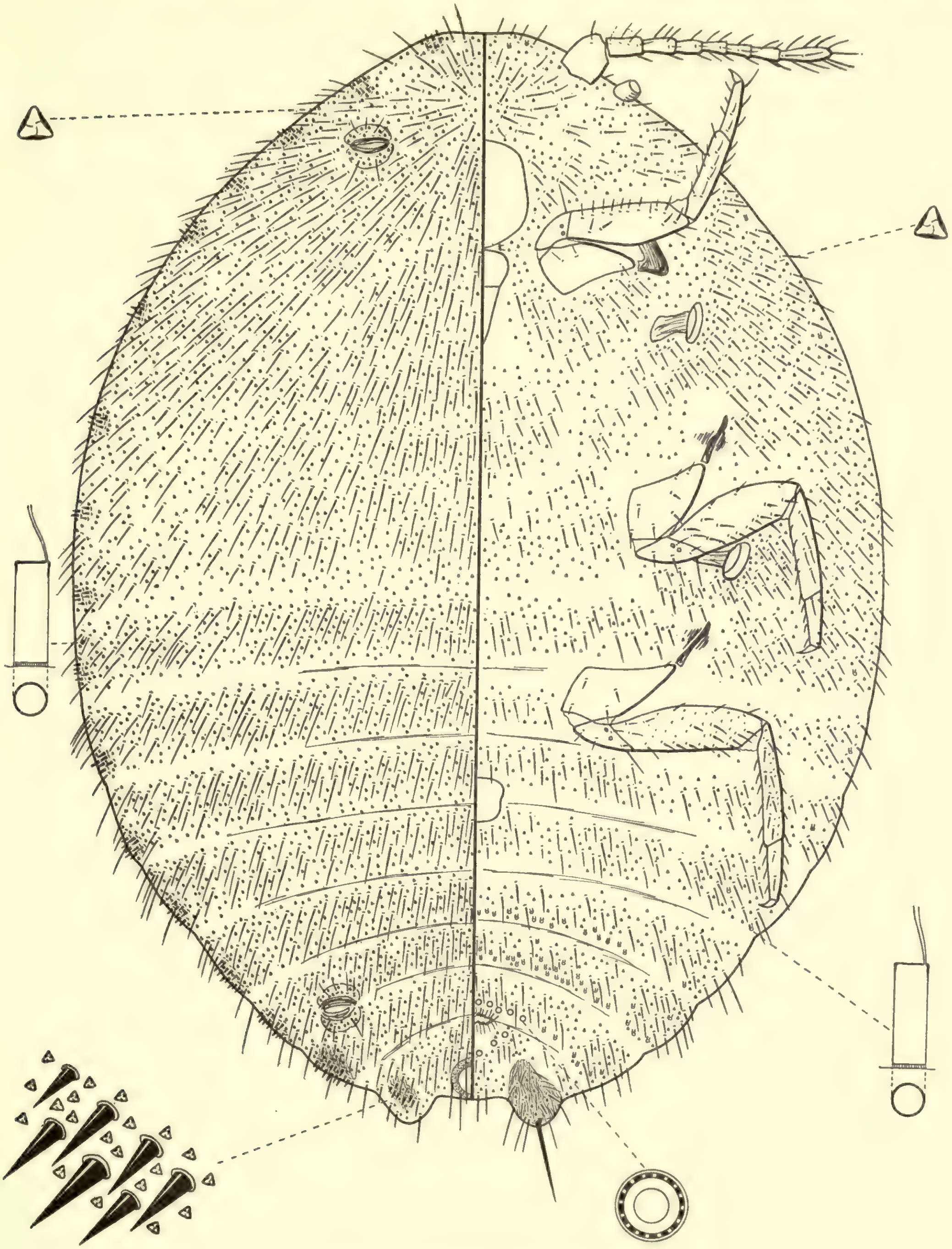

FIG. 2. *Criniticoccus ficus* sp. n.

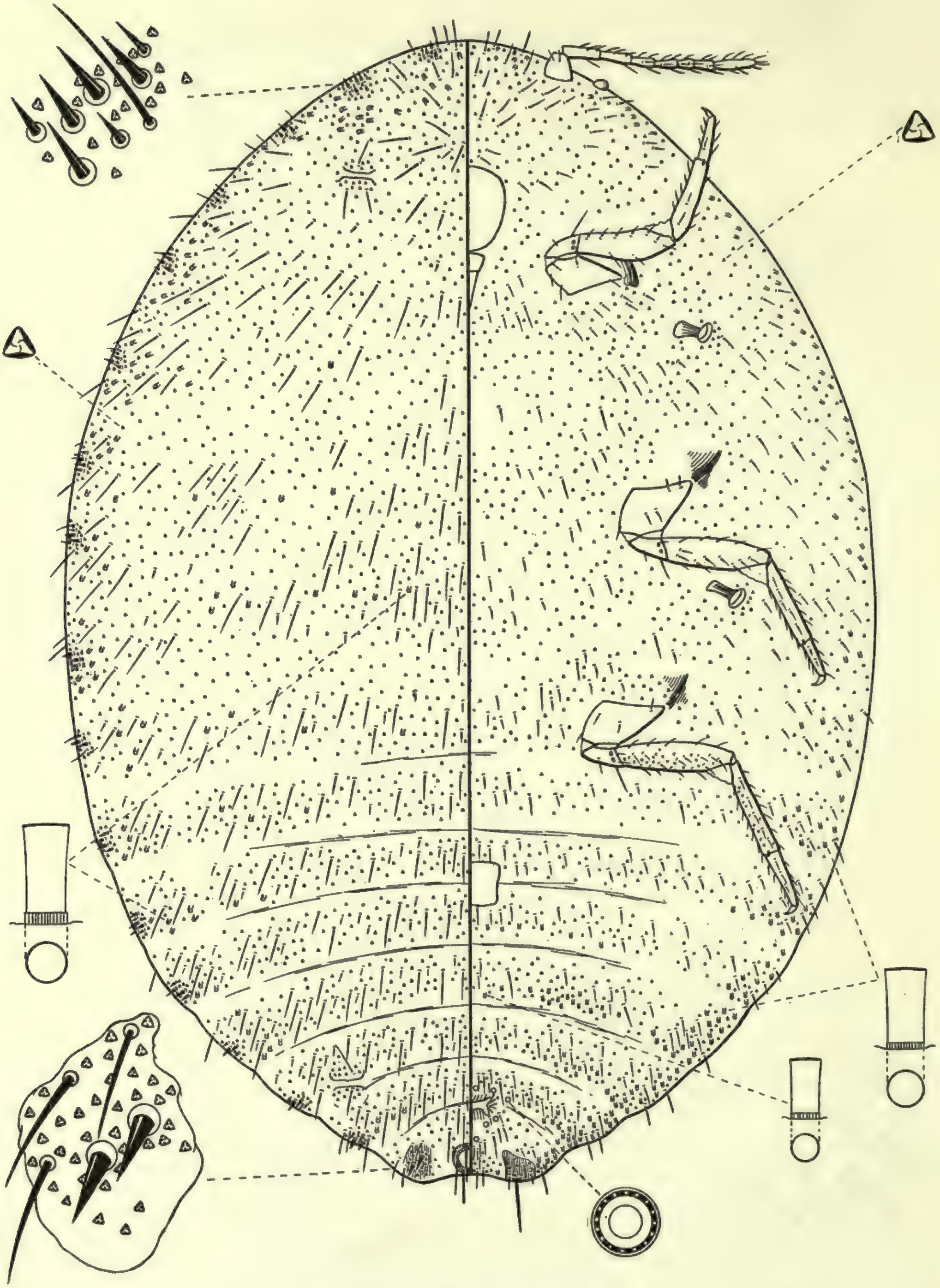

FIG. 3. *Criniticoccus tectus* sp. n.

abdominal segments. Dorsal setae of various sizes but mainly long and slender and longer than anal ring setae, in well defined rows on abdomen but split up and tending to form groups on thorax and head. Dorsal tubular ducts of one size with a well developed collar, in small marginal groups and in single rows on thoracic and anterior abdominal segments. Trilocular pores rather numerous.

Ventral surface with a pair of apical setae nearly twice as long as anal ring setae, on a more or less quadrate sclerotized area bearing 3 or 4 slender setae and a few trilocular pores. Ventral setae not numerous, usually more slender and shorter than dorsal setae. Multilocular disc pores confined to about 6 on the prevulvar segment and a group of 2–6 posterior to the vulva. Tubular ducts of two sizes but smaller than those on dorsum, a small type of duct situated in transverse rows on midregion of segments 5–8 and a larger type present in groups around the margins, which become less numerous anteriorly. Trilocular pores numerous and evenly distributed. Vulva of an indefinite shape with noticeable internal folds.

Criniticoccus theobromae sp. n.

(Text-fig. 4)

HABIT. On the fruits of *Theobroma cacao* tended by *Technomyrmex detorquens*. The ants build carton shelters over them and the colonies are situated down the length of the fruit in the grooves. The species has been collected in the following areas :— SANTA YSABEL, Holokama, 21.ii.1956, E. S. Brown (Type material). BOUGAINVILLE, Numa Numa 1.iv.1956, J. J. H. Szent-Ivany.

RECOGNITION CHARACTERS. Body broadly ovate measuring about 2·7 × 2·0 mm. Antennae 8-segmented. Legs normal, femur rather stout, translucent pores on femur and tibia. Circulus quite large, very noticeable in lateral aspect by hanging underneath the body and distorting the neighbouring segments when flattened on the slide. Ostioles present, well developed. Anal ring removed a short distance from apex of body, with 6 setae these only slightly longer than diameter of ring. Cerarii numbering 17 pairs, anal lobe cerarii with 2 stout conical setae and a cluster of trilocular pores surrounded by a more or less oval sclerotized area. Anterior cerarii each with 5–11 conical setae of various sizes but usually with 2 which are larger than the others. Dorsal setae mainly long and slender in most cases being as long as or longer than anal ring setae. Tubular ducts with a narrow oral rim, arranged singly behind the frontal cerarii and usually on the inner side of the thoracic and anterior abdominal cerarii there being usually about 5 pairs altogether. An occasional duct with oral collar sometimes present on the mid-thoracic region. Trilocular pores distributed evenly over surface.

Ventral surface with a well defined sclerotized area extending inwards from the anal lobes, containing about 8 setae including a long pair of apical setae, this area about same size or slightly larger than area of anal ring. Ventral setae mainly slender and for the most part are shorter than those of dorsum. Multilocular disc pores confined to a row of 5–10 on the eighth segment and another 5–10 posterior to the vulva. Tubular ducts of two sizes both with oral collar ; a smaller type

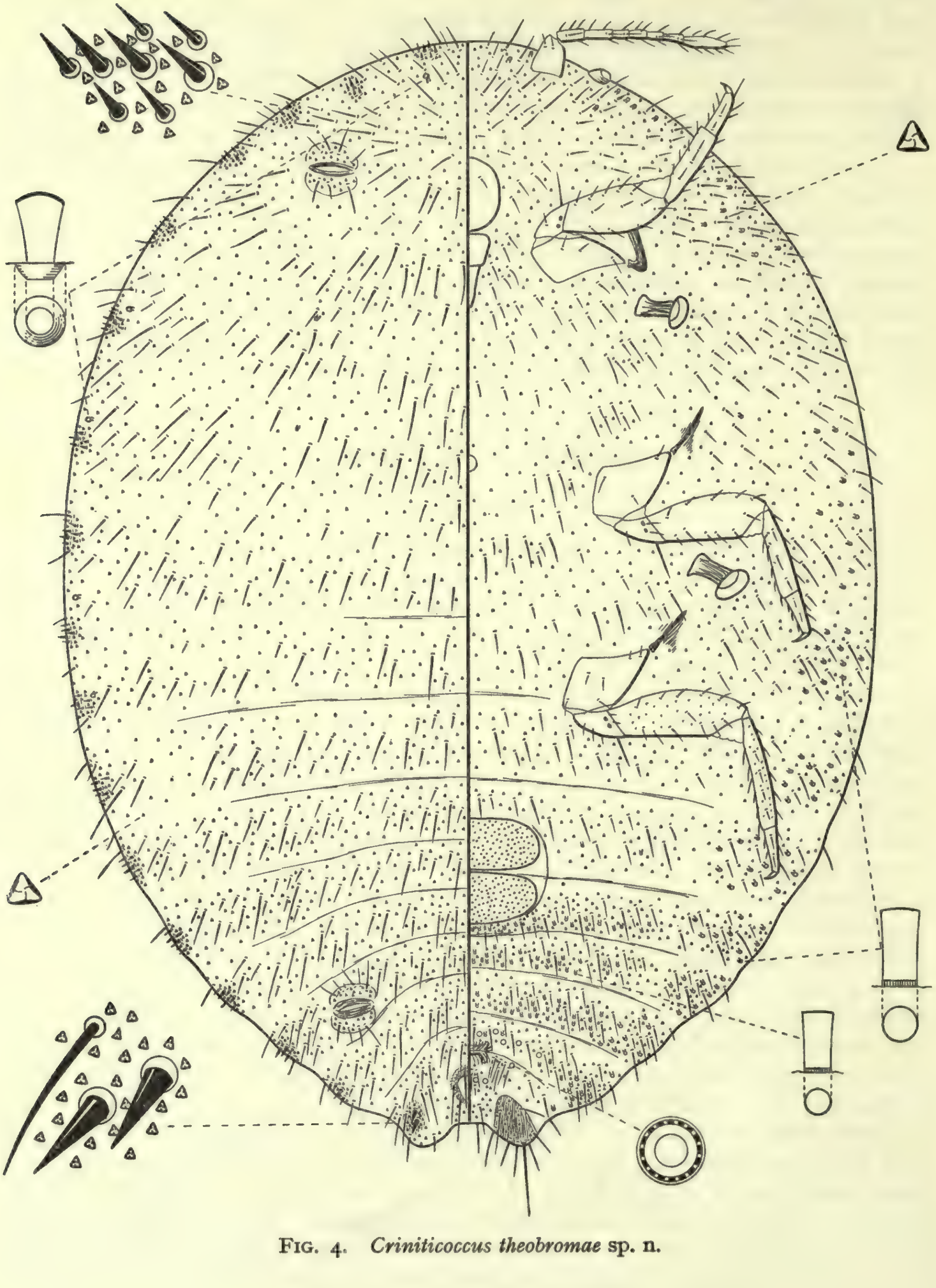

FIG. 4. *Criniticoccus theobromae* sp. n.

situated in transverse rows in the median areas of segments 6–8 although there are sometimes a few such ducts on the fifth segment ; a larger type is arranged in groups around the margins from the anal lobes to the head, becoming less numerous anteriorly. Trilocular pores not numerous.

Dysmicoccus Ferris

Dysmicoccus Ferris, 1950, *Atlas of Scale Insects of North America*, **5** : 53.

This genus differs from *Pseudococcus* Westwood in lacking dorsal oral rim ducts. A number of species of *Pseudococcus* from the Pacific area have a reduced number of these ducts and in occasional specimens they are absent entirely. The genera are herein considered to be distinct until a revision of the whole group may show otherwise. In its present form *Dysmicoccus* comes close to *Criniticoccus* to which it differs in having cerarii with less than 5 setae and with the dorsal setae shorter than the anal ring setae.

Dysmicoccus brevipes (Cockerell)

Dactylopius brevipes Cockerell, 1893, *Entomologist*, **26** : 267.

Pseudococcus cocotis (Maskell), Pagden & Lever, 1935, *Brit. Solomon Is. agric. Gaz.*, **3** : 18 (misidentification).

Dysmicoccus brevipes (Cockerell), Ferris, 1950, *Atlas of Scale Insects of North America*, **5** : 59.

GUADALCANAL : Kukum, *Annona muricata* 13.viii.1954, *Cyperus* sp. 22.ix.1955 ; Rua Vatu, *Pandanus* sp. 5.iv.1955, *Cocos nucifera* roots associated with *Pheidole megacephala* ; Kokumbona, pineapple 6.xi.1954.

Specimens at hand collected and recorded by Pagden & Lever (1935) as *Pseudococcus cocotis* (Maskell) from coconut have been misidentified and are undoubtedly specimens of *Dysmicoccus brevipes* (Cockerell).

Exilipedronia gen. n.

Type of genus *Exilipedronia sutana* sp. n.

RECOGNITION CHARACTERS. Pseudococcidae with 18 pairs of cerarii each with up to 10 conical setae and borne on a sclerotized area or plate ; dorsal setae of various sizes ranging from conical and similar to cerarian setae, to small and slender, often with one or two trilocular pores at the bases but not surrounded by sclerotized areas ; anterior and posterior pairs of ostioles well developed ; circulus present ; antennae 6-segmented ; multilocular disc pores on venter only ; tubular ducts of oral collar type on venter ; ventral side of anal lobes with a well developed anal bar continuous with dorsal sclerotization ; anal ring cellular with 6 setae ; legs slender, claw without a denticle.

NOTES. This genus differs from *Pedronia* Green in possessing 18 pairs of cerarii all on sclerotized plates with the cerarian setae much more slender and numbering up to 10. In *Pedronia* the cerarian setae are in pairs and quite stout and not borne on sclerotized areas. Species at present placed in the genus *Pedronia* do not appear to be congeneric with the type. The nearest approach to *Exilipedronia* seems to be *Pedrococcus* Mamet but all the species in this genus have dorsal setae or cerarii on sclerotized areas.

Exilipedronia sutana sp. n.

(Text-fig. 5)

HABIT. A mealybug covered with white wax living in lines down the midribs of an unknown tree, GUADALCANAL : Sutakiki River, 26.vi.1956 and Suta 29.vi. 1956.

RECOGNITION CHARACTERS. Body elongate-oval, length of mounted specimens about 2·5 mm., anal lobes well developed. Cerarii numering 18 pairs each borne on a sclerotized plate and possessing 4–10 conical setae of various sizes, the largest cerarii on anal lobes and head and becoming progressively smaller towards thorax. Antennae 6-segmented. Legs short and slender, posterior coxae with a few translucent pores. Circulus well developed. Ostioles with 2–4 small conical setae on each lip and with inner edges of lips sclerotized. Anal ring with 6 setae which are about twice as long as diameter of ring. Dorsal setae mainly conical and similar to those of cerarii, differing in size, lying in transverse rows and occasionally between the cerarii, often with one to three trilocular pores at base, never borne on sclerotized areas ; other dorsal setae small and slender, not numerous. Trilocular pores sparse.

Ventral surface with an anal bar which is continuous with the sclerotized area on dorsal surface of anal lobes. Apical setae long and stout, longer than anal ring setae. Multilocular disc pores few there being usually a pair on the sixth abdominal segment, 5–6 on the seventh segment, 4–10 on the eighth segment and 4–8 posterior to the vulva, altogether there are scarcely more than 25. Tubular ducts small, of oral collar type, situated in submedian area of segments 6–8 in numbers of 2–3 on each segment. They are more numerous around the submargin of head and thorax also anterior to the clypeus and between the anterior coxae and labium. Trilocular pores sparse.

Ferrisiana Takahashi

Ferrisiana Takahashi, 1929, *Trans. nat. Hist. Soc. Formosa*, **19** : 429.
Ferrisiana Takahashi, Ferris, 1950, *Atlas of Scale Insects of North America*, **5** : 88.

The cosmopolitan species belonging to this genus has been found on only two occasions in BOUGAINVILLE. Although it may be present in the Solomon Islands it does not seem to have gained a foothold.

Ferrisiana virgata (Cockerell)

Dactylopius virgata Cockerell, 1893, *Entomologist*, **26** : 178.
Ferrisiana virgata (Cockerell), Ferris, 1950, *Atlas of Scale Insects of North America*, **5** : 93.

Collected at BOUGAINVILLE, Kieta, on *Erythrina* sp. 1935 and on *Leucaena glauca* 17.viii.1938 by J. L. Froggatt.

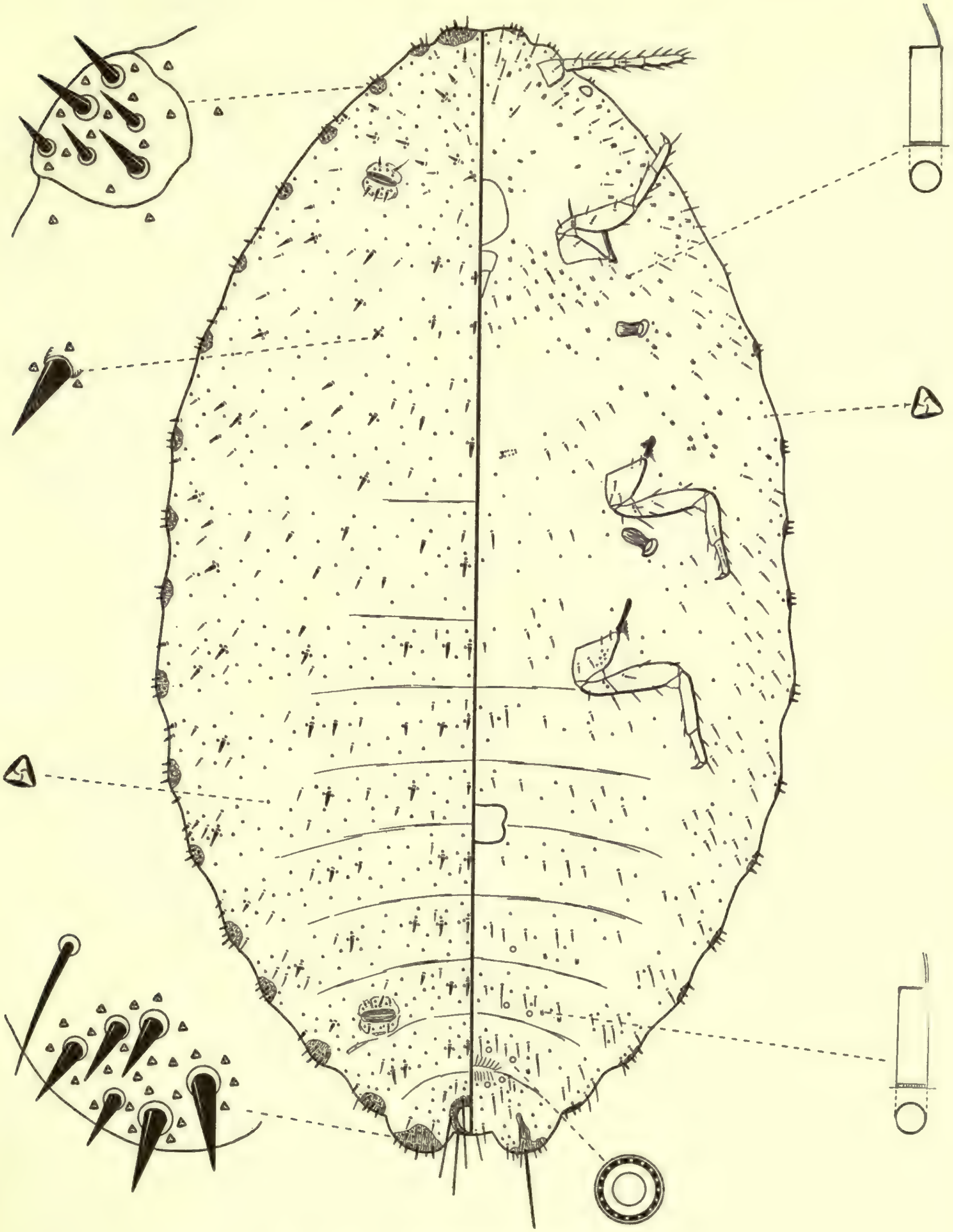

FIG. 5. *Exilipedronia sutana* sp. n.

Laingiococcus Morrison

Laingiococcus Morrison, 1945, *J. Wash. Acad. Sci.*, **35** : 54.

Recognition characters. Pseudococcidae with anal lobes removed a short distance on the dorsal surface so that the angles formed by the margins of the penultimate segment appear as anal lobes ; anal ring lying about twice its diameter from apex of body, with a double band of pores and 6 setae ; antennae 9-segmented ; legs long and slender, claw with a distinct denticle ; cerarii absent ; setae on dorsum and ventral margin, numerous, stout and stiff, of various sizes, other setae slender ; quinquelocular disc pores on dorsum and venter ; multilocular disc pores on ventral side of abdomen only ; tubular ducts of oral collar type very few on ventral surface ; circulus transversely elliptical situated within boundaries of the fourth segment ; labium 2-segmented.

Notes. Morrison (1945) erected this genus for *Heterococcus painei* Laing and stated that it differed widely from the other genera of the *Heterococcus* group. Although Laing has described the labium as unsegmented and the anal ring with only one pore band, both are normal. The dorsal and ventral surfaces have a number of trilocular pores but this character would not normally exclude the genus from the *Heterococcus* series because these pores are often present in the genus *Heterococcus*. However, the absence of cerarii and the shape of the setae do not suggest a close relationship to this group.

Laingiococcus painei (Laing)

(Text-fig. 6)

Heterococcus painei Laing, 1930, *Bull. ent. Res.*, **21**,: 20, 21.
Laingiococcus painei (Laing), Morrison, 1945, *J. Wash. Acad. Sci.*, **35** : 54.

Habit. Described originally from the Solomon Islands (no locality given) on coconut. Notes given by E. S. Brown show that the insect is without mealy wax and the body colour ranges from yellow to brown or even pinkish and often found in dense groups near ants' nests where they are tended by the ants or found within the nests. Guadalcanal : Tenaru, *Ficus* sp. 10.viii.1954, unknown vine, 12.viii. 1954, coconut, 12.v.1955 ; Kukum, coconut 20.vii.1954 ; Rua Vatu, *Ficus* sp. 23.vi.1954 ; Rua Sura Is., on a shrub 17.viii.1955 ; Mamara, *Ficus septica* 30.vii.1955. Russell Is.: Pepesala, *Ficus* sp., 7.vii.1954. San Cristobal : Kira Kira, *Ficus* sp., 20.vii.1956. Kolombangara : Karikana, *Maesa* sp. In nearly all cases the mealybugs are tended by *Oecophylla smaragdina*.

Recognition characters. Adult female ovate measuring approximately 2·1 × 1·8 mm. Anal lobes on dorsal surface, removed a short distance from posterior margin so that the angles formed by the lateral margins of the penultimate segment appear as anal lobes. Antennae 9-segmented. Legs normal, claw with a well developed denticle. Circulus transversely elongate situated within the boundaries of fourth segment. Ostioles absent. Anal ring with a double row of pores, situated about twice its diameter from apex of body, with 6 setae, these slightly longer than diameter of ring. Cerarii absent. Dorsal surface with numerous setae of various sizes ranging

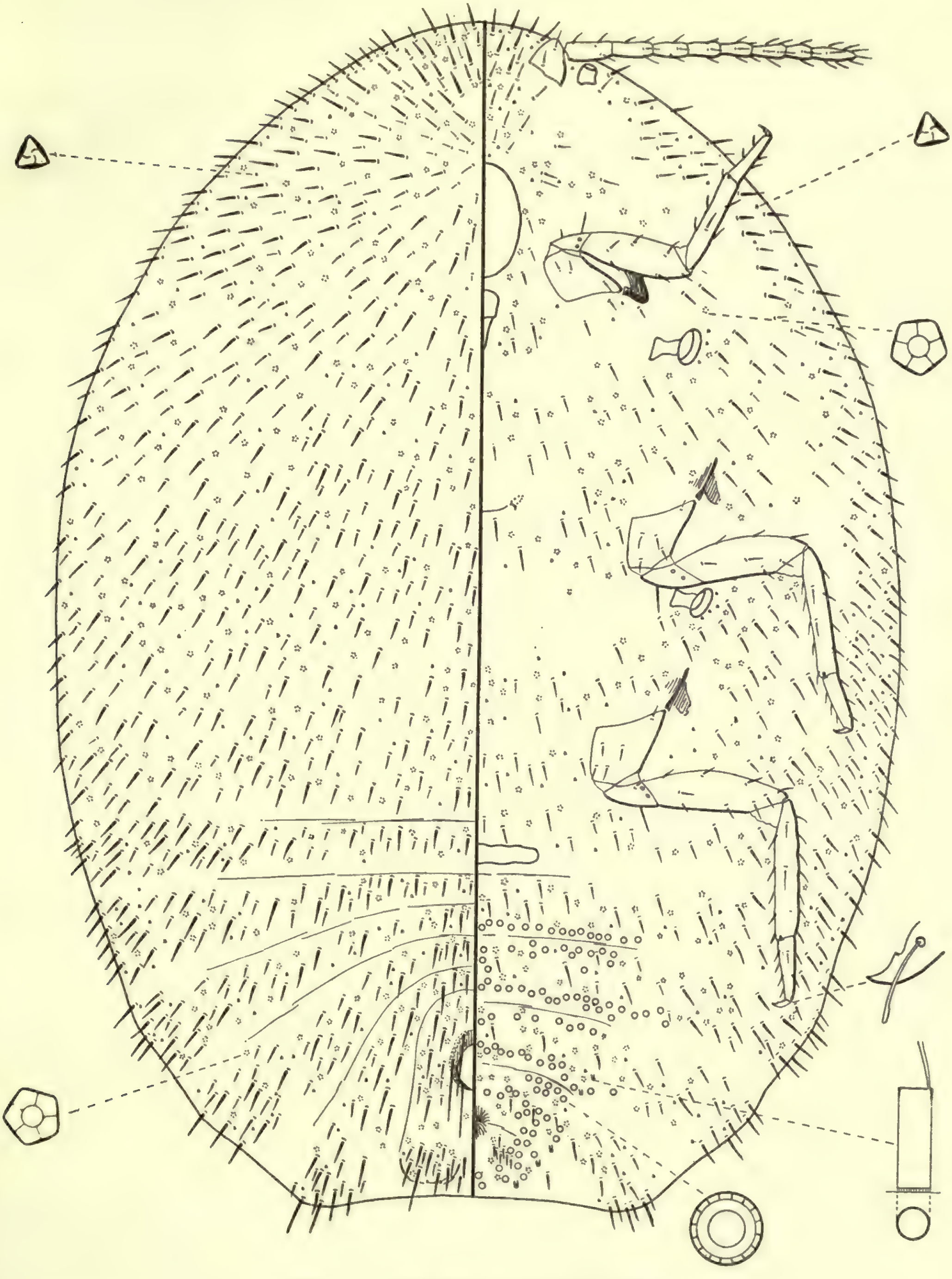

FIG. 6. *Laingiococcus painei* (Laing)

from short and slender to long and stout, the latter tending to be more numerous around margins. Quinquelocular disc pores scattered over entire dorsal surface. Trilocular pores sparse but evenly distributed.

Ventral surface with slender setae in midregion but replaced laterally by stouter setae similar to those on dorsal surface. Multilocular disc pores on all segments posterior to circulus, confined to midregion in more or less single transverse rows on the posterior edges and on anterior edges of sixth to eighth segments. Tubular ducts few in number there being one or two in each of submedian areas of segments 7–9. Quinquelocular disc pores uniformly distributed except on the intersegmental lines. Trilocular pores sparse but present on all segments and noticeable in small groups of 3–4 around spiracular openings.

NOTES. The name mentioned by Lever (1933) as *Phenacoccus horridus* Green is a ***nomen nudum*** and refers to this species.

Laminicoccus gen. n.

Type of genus *Tylococcus giffardi* Ehrhorn.

RECOGNITION CHARACTERS. Pseudococcidae with body broadly oval; cerarii numbering 17 pairs and borne on distinct sclerotized plates, cerarii each with 6–10 or more conical setae; body setae all slender; legs normal, claw without a denticle; anterior and posterior ostioles present; circulus present or absent; anal ring with 2 rows of pores and 6 setae; tubular ducts on dorsum and venter, more numerous around margins, either with small oral rim or of oral collar type; multilocular disc pores mainly on ventral side of abdomen.

NOTES. This is a distinctive genus by the presence of cerarii with numerous conical setae surrounded by definite sclerotized areas. It may be confused with some genera of the *Phenacoccus* series, for instance *Rastrococcus* Ferris has cerarii borne on sclerotized plates but in this genus there is also a denticle on the claw and the antennae are 9-segmented. Some species of the genus *Puto* Signoret may be confused with species of the genus *Laminicoccus*. The genus *Puto* normally contains species with cerarii on sclerotized plates, with 9-segmented antennae and with a denticle on the claw. At least two species are without the denticle and one of these, *Puto alpinus* Balachowsky has 8-segmented antennae. These species and all other similar species of genera in the *Phenacoccus* series have either dorsal cerarii or minute lanceolate setae on the dorsal surface and the genus *Laminicoccus* has species with slender setae.

Apart from the type the following new species and *Pseudococcus vitiensis* Green & Laing described from Fiji are included in the genus and may be separated by the following key :—

1. Circulus present, tubular ducts of oral collar type only 2
– Circulus absent, tubular ducts small each with a narrow oral rim . *giffardi* (Ehrhorn)
2. Multilocular disc pores on posterior edges of segments only totalling about 70–90, tubular ducts in midregion of seventh and eighth segments . . *cocois* sp. n.
– Multilocular disc pores on anterior and posterior edges of seventh and eighth segments, total number in region of 140–170, tubular ducts in midregion of abdomen on fifth to eighth segments . . . . *vitiensis* (Green & Laing)

Laminicoccus cocois sp. n.

(Text-fig. 7)

HABIT. Collected from the terminal bud of coconut, ONTONG JAVA, Pelau, 3.ii.1955.

RECOGNITION CHARACTERS. Shape of adult female broadly oval, approximately 2·5 mm. in length. Antennae 8-segmented. Legs normal, each posterior leg with translucent pores on the coxa, femur and tibia. Circulus of moderate size, round. Ostioles present, each with two or three setae and a few trilocular pores on lips. Anal ring with 6 setae, these about twice as long as diameter of ring. Cerarii numbering 17 pairs, each borne on a distinct sclerotized plate; anal lobe cerarius with 7–8 conical setae of various sizes and a cluster of trilocular pores on a sclerotized plate which is about same size as anal ring; other cerarii each with 6–8 conical setae except the two anteriormost which often have up to 11 setae; the sclerotized plates becoming smaller towards thorax. Dorsal setae not numerous, all slender. Tubular ducts of oral collar type situated around the margins in small groups. Trilocular pores evenly distributed.

Ventral surface of each anal lobe with a triangular sclerotized area and a long, stout, apical seta. Ventral setae of various sizes, all slender. Multilocular disc pores confined to posterior edges only of fifth to eighth segments and also to a group posterior to vulva, there being 2–4 on fifth segment, in single transverse rows on sixth and seventh segments and in a double row on eighth segment, altogether there are about 70–90 pores. Tubular ducts similar to those on dorsum in small groups around the margin from the anal lobes to a point lateral to the first coxae; other tubular ducts of smaller diameter sparse, in the midregions of seventh and eighth segments and also occasionally in the submarginal area. Trilocular pores not numerous.

NOTES. This species comes very close to *L. vitiensis* (Green & Laing) described from Fiji. It differs from the latter in having a row of multilocular disc pores at the posterior edge only of segments 7 and 8, whilst in *L. vitiensis* these segments have rows at the anterior edges also. A few other differences with *L. vitiensis* and with the type of the genus are noted in the key.

Maculicoccus gen. n.

Type of genus *Trionymus malaitensis* Cockerell.

RECOGNITION CHARACTERS. Broadly oval species of Pseudococcidae with 8-segmented antennae; with anterior and posterior pairs of ostioles. Legs rather stout without a denticle on claw; circulus present, well developed; cerarii confined to the two posterior pairs or to anal lobes only, with up to 7 conical setae; dorsal setae mainly long and stout. Anal ring lying a short distance from apex of body, cellular, with 6 setae; multilocular disc pores about the vulva only; tubular ducts of oral collar type on ventral side of abdomen; median areas of venter with numerous irregularly shaped disc pores each with granular surface and smaller than a multilocular disc pore; ventral side of anal lobes with a well defined sclerotized area.

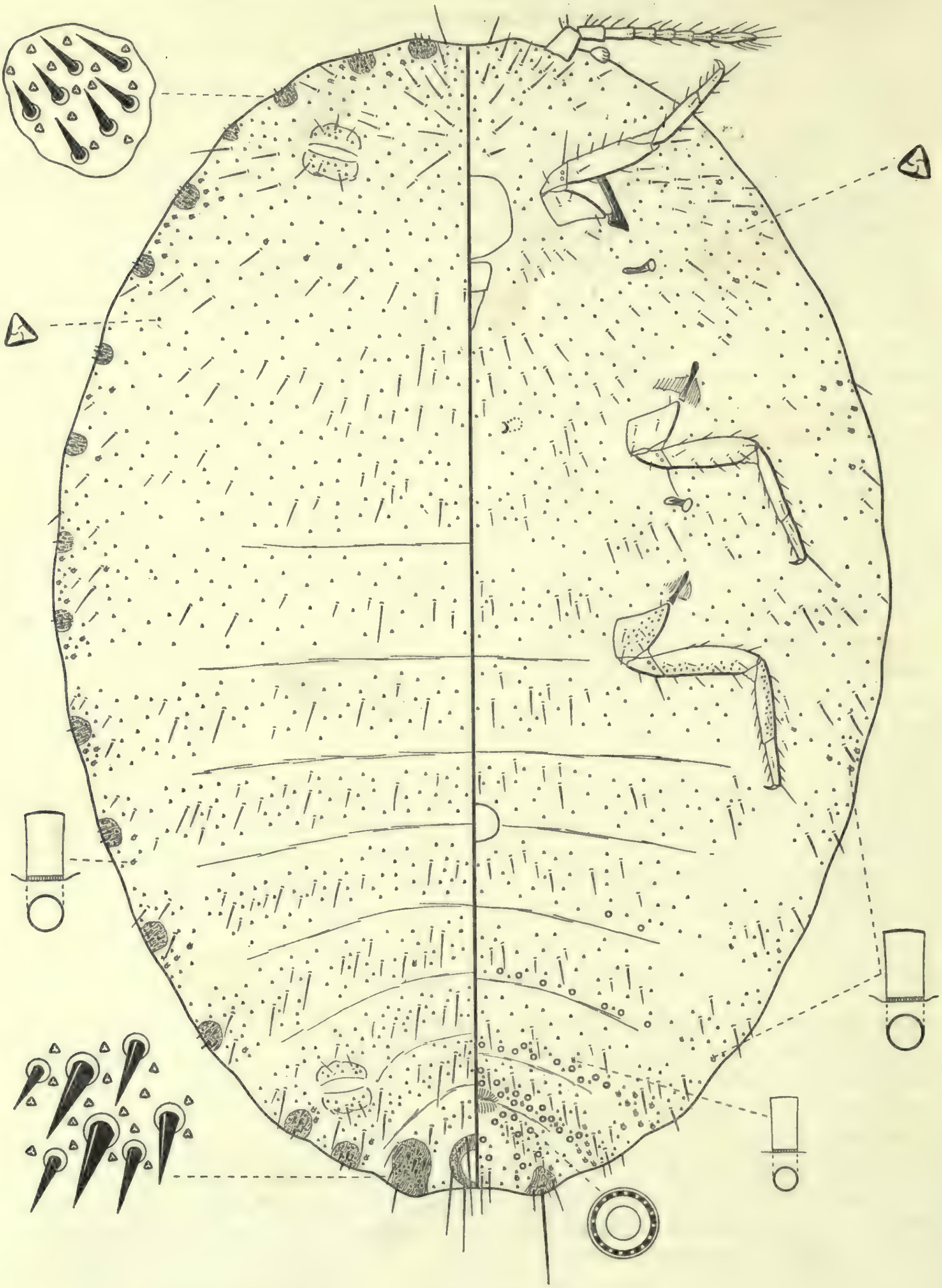

FIG. 7. *Laminicoccus cocois* sp. n.

NOTES. In his original description of the type species Cockerell had some doubt as to whether it was correctly placed in the genus *Trionymus*. It seems to have little in common with this genus as the circulus is quite large and the dorsal setae are mainly long and stout or bristle-like. Furthermore the ventral surface is beset with numerous disc pores, none of these characters being common to *Trionymus* and therefore a new genus has been erected for the single species. At this stage when so few genera are known in the Pseudococcidae it is difficult to give any relationship with this genus to any other.

Maculicoccus malaitensis (Cockerell)

(Text-fig. 8)

Trionymus malaitensis Cockerell, 1929, *Entomologist*, **62** : 90, 91.

HABIT. Cockerell described this species from Malaita on coconut. It seems to infest a number of plants. The insect is brown to brownish yellow, naked except for a few white flecks at the posterior end, occurring in compact masses and in each case tended by *Oecophylla smaragdina*.

GUADALCANAL : Trench's beach, Ilu and Marau on unidentified trees. SAN CRISTOBAL : Waimamura, *Inocarpus edulis*, 20.iv.1955 ; Malau and Three Sisters on unknown shrub. SANTA YSABEL : Holokama, *Theobroma cacao*, 17.ii.1956. SHORTLAND IS.: Loping Estate, *Cocos nucifera*, H. T. Pagden, 25.iv.1934.

RECOGNITION CHARACTERS. Body broadly ovate, anal lobes developed ; attaining a size of 2·0 × 1·5 mm. Antennae 8-segmented. Legs well developed, stout. Circulus present, rather large and lying between fourth and fifth segments. Lips of ostioles with numerous trilocular pores but without setae, inner edges of lips sclerotized and peculiarly short. Anal ring lying at a distance of about half its diameter from the posterior margin, with 6 setae which are a little longer than diameter of ring. Cerarii confined to either the two posterior segments or in one case to the anal lobes only, anal lobe cerarii each consisting of 6–7 conical setae of various sizes surrounded by numerous trilocular pores. Penultimate cerarii each with 3–5 conical setae and a few trilocular pores. Dorsal surface with long robust setae especially near margins and midregion, interspersed with shorter and more slender setae. Trilocular pores absent in some of submedian areas of posterior abdominal segments but elsewhere evenly distributed.

Ventral surface of anal lobes with a long stout pair of apical setae and a more or less quadrate sclerotized area. Ventral setae of various sizes, slender in midregion but becoming more robust and longer towards lateral margins where they are similar to those on dorsum. Multilocular disc pores few there being usually 2–3 on eighth segment near vulva and 2–3 posterior to vulva, the total number being rarely more than 4 or 5. Tubular ducts on segments posterior to circulus, on the fifth segment there is a small median group and posteriorly they become more numerous to the eighth segment lying in transverse rows at the posterior edges, there being also a small group on each anal lobe. Median areas of thorax and anterior abdominal segments thickly beset with irregularly shaped disc pores, intermediate in size

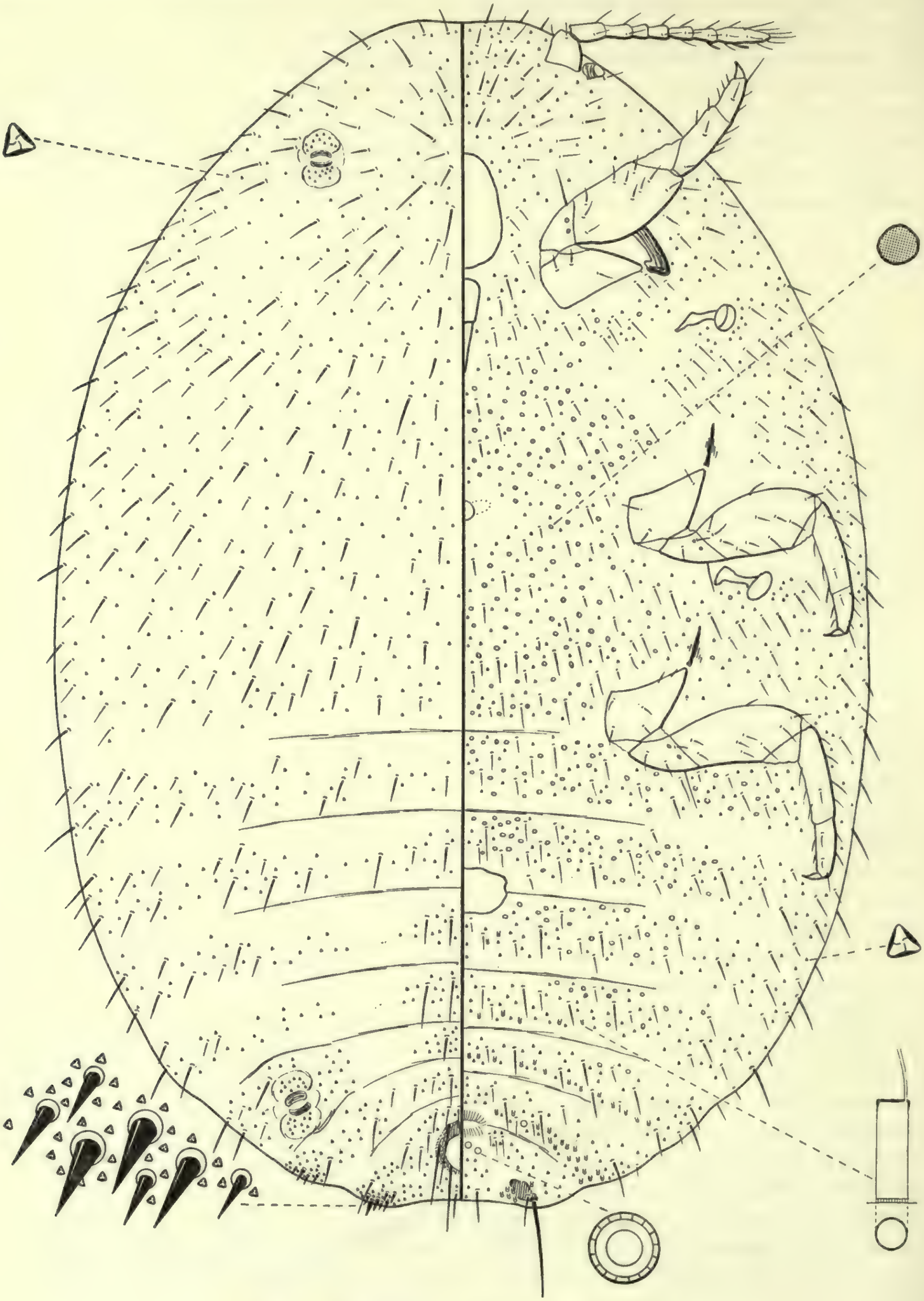

FIG. 8. *Maculicoccus malaitensis* (Cockerell)

between trilocular and multilocular disc pores, the usual shape being oval with a granular surface. Trilocular pores with a uniform distribution.

NOTES. The specimens collected at Shortland Islands differ from the others in possessing a single pair of cerarii only but as all the other characters are the same this character alone does not seem to be of specific difference.

Mollicoccus gen. n.

Type of genus *Mollicoccus guadalcanalanus* sp. n.

RECOGNITION CHARACTERS. Pseudococcidae with poorly developed anal lobes; cerarii absent; antennae 7-segmented; legs slender, claw with a small denticle near apex; ostioles present as a poorly developed posterior pair only; circulus absent; dorsal setae sparse, mainly long and moderately stout; multilocular disc pores present on venter only, dorsal tubular ducts of oral collar type quite large, diameter greater than that of multilocular disc pores; ventral tubular ducts of smaller diameter than multilocular disc pores; anal ring cellular with 6 setae; ventral surface of anal lobes with a small area of sclerotization.

NOTES. The absence of cerarii and the presence of large ducts on the dorsum, each with a diameter greater than a multilocular disc pore serve to distinguish this genus from others in the *Phenacoccus* series.

Mollicoccus guadalcanalanus sp. n.

(Text-fig. 9)

HABIT. External appearance not known. Collected from carton shelters made by *Iridomyrmex myrmecodiae* on the leaves close to the petiole attachment of a small unidentified tree. GUADALCANAL: Tinahula River, 22.iii.1955.

RECOGNITION CHARACTERS. A small, fragile, oval species measuring approximately 1·4 × 1·0 mm., anal lobes poorly developed. Antennae 7-segmented. Legs normal, rather small, claw with a small denticle near apex. Circulus absent. Ostioles represented by a small, posterior pair with about 3 trilocular pores on each lip but without setae. Anal ring with 6 setae, these nearly twice as long as diameter of ring. Cerarii absent. Dorsal surface with few setae, these mainly long and stout. Tubular ducts of a distinctive type present on all segments, each duct of oral collar type with a diameter greater than that of a multilocular disc pore, distributed in lateral groups of 2–4 on the last 3 segments, in more or less single transverse rows on the anterior abdominal segments and becoming more numerous and scattered on the thorax and head. An occasional small tubular duct present on margins. Trilocular pores sparse.

Ventral surface with a small area of sclerotization on each anal lobe and a pair of long apical setae. Ventral setae slender, shorter than those on dorsum, not numerous. Multilocular disc pores confined mainly to abdomen where there are about 6–8 on the anterior edge of each segment, a few also present between second and third pairs of coxae. Tubular ducts of three sizes all of oral collar type; a large type

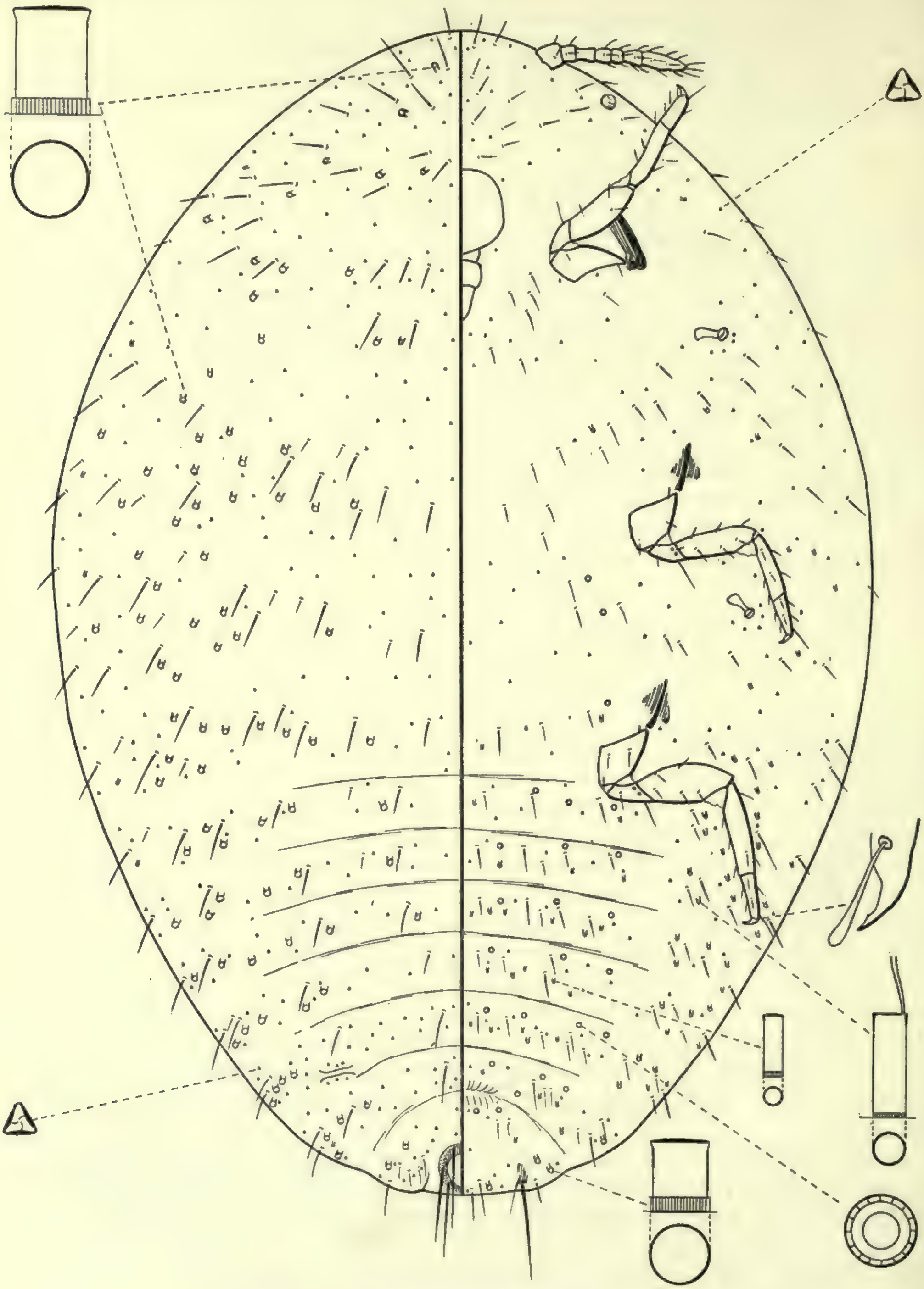

FIG. 9. *Mollicoccus guadalcanalanus* sp. n.

approaching in size the large ducts on dorsum is situated on the anal lobes and sometimes on the eighth segment, there being scarcely more than 8–10 in all. A small type of duct present in midregion of abdominal segments often interspersed with a slightly larger type, the latter more common laterally, other ducts sparsely distributed on thoracic margins and between coxae. Trilocular pores sparse.

Mutabilicoccus gen. n.

Type of genus *Farinococcus simmondsi* Laing.

RECOGNITION CHARACTERS. Broadly oval species of Pseudococcidae with antennae 6–8-segmented; legs normal, without a denticle on the claw; anal ring situated at apex of body, cellular, with 6 setae; anal bar well developed on ventral side of anal lobes; anterior and posterior ostioles present; cerarii variable, either with 18 pairs, each with 2 long stout setae similar to dorsal setae, with numerous, long, stout setae, the groups recognizable by the concentrations of trilocular pores, or forming a more or less continuous band with setae of similar width at the base but varying from short and conical to longer than anal ring setae and stouter than body setae; multilocular disc pores on venter of abdomen only; tubular ducts on venter only. Circulus present or absent, when present rather large and well developed.

NOTES. This genus has been erected because the type species bears little resemblance to *Farinococcus* Morrison redefined by Ferris (1955) or to similar genera. It differs in having the anal ring at the apex of the body and in having peculiar cerarii. In *Farinococcus* the cerarian setae are small and conical and the body setae are minute whilst in *Mutabilicoccus* the cerarian setae are much larger and either the same size as the dorsal setae or if larger they show considerable variation in length. It is not certain whether the new species described below is congeneric with the type but it has been placed here for the time being pending the discovery of similar species. The two species may be separated as follows:—

Cerarii forming a more or less continuous band, the setae although of similar width at the base varying in length from small and conical to longer than anal ring setae, always stouter than dorsal setae . . . . *artocarpi* sp. n.
Cerarii either recognizable as 18 pairs with paired setae of same size as dorsal setae or forming a continuous band varying in size and merging with the dorsal setae, in which case their presence can be detected by the concentrations of trilocular pores (see accompanying diagrams) . . . . . . *simmondsi* (Laing)

Mutabilicoccus artocarpi sp. n.

(Text-fig. 10)

HABIT. Taken from the aerial roots of *Artocarpus incisus* tended by *Iridomyrmex myrmecodiae*. MALAITA: Hauhui, 8.ix.1954.

RECOGNITION CHARACTERS. Shape broadly oval, largest available specimens measuring approximately 3·0 × 2·0 mm. Antennae 7–8-segmented. Legs normal, rather small for size of body, posterior coxae with a few translucent pores. Circulus

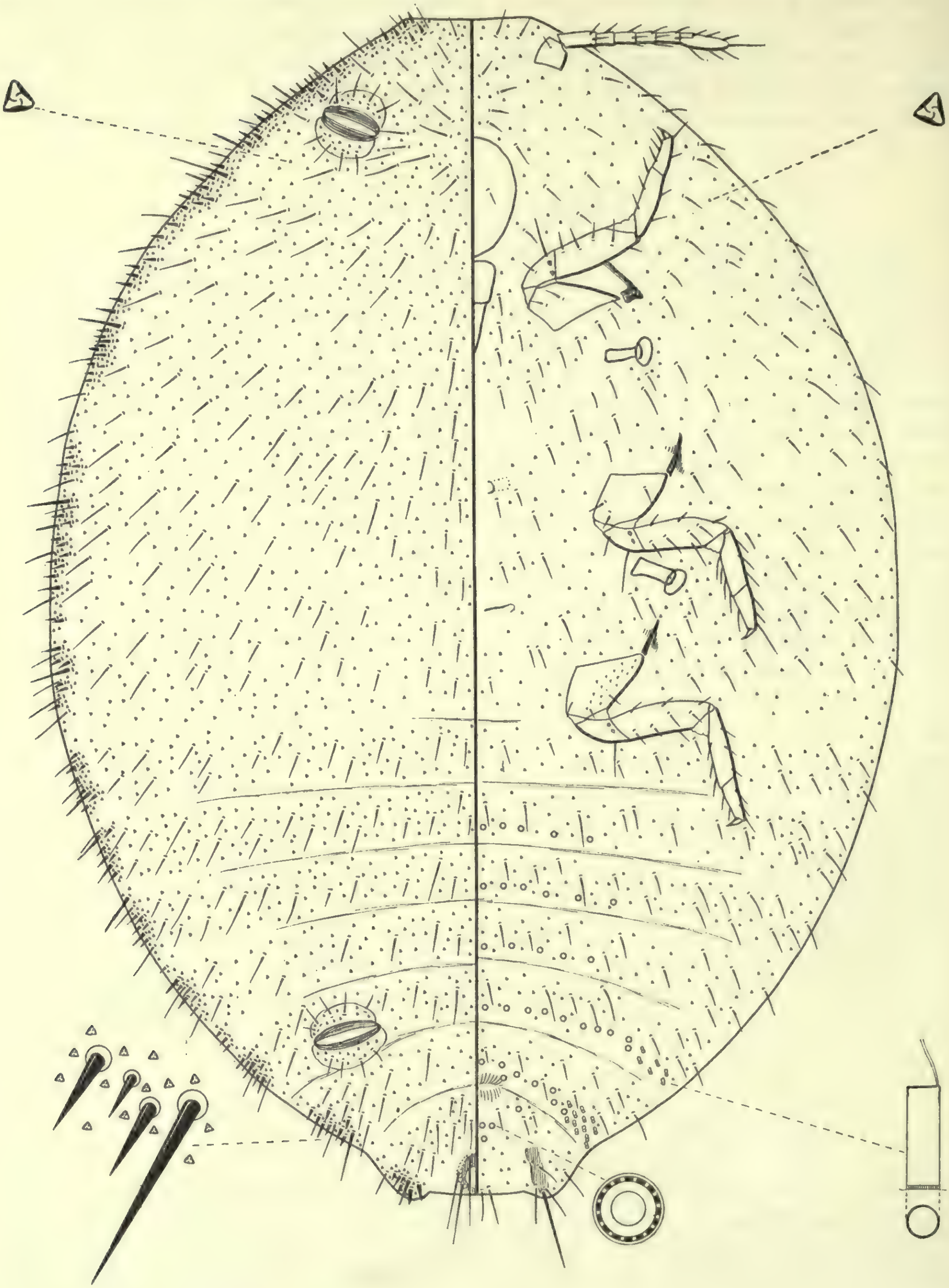

FIG. 10. *Mutabilicoccus artocarpi* sp. n.

absent. Ostioles well developed, the inner edges of the lips sclerotized. Anal ring with 6 setae which are about twice as long as its diameter. Cerarii distinct on the abdomen, each comprising numerous trilocular pores and numerous setae of very different sizes ranging from small and conical to long and stout, the latter often longer than anal ring setae but all having more or less same diameter at base; anterior cerarii in a more or less continuous zone with similar setae to those on abdomen; other setae in the cerarii, presumably auxiliary setae, are long and slender and similar to dorsal setae which often approach length of anal ring setae. Dorsal pores of trilocular type only, somewhat numerous.

Ventral surface of each anal lobe with a long, stout apical seta and a distinct anal bar. Ventral setae all slender but not as long as those on dorsum. Multilocular disc pores in single transverse rows in midregion of posterior edges of segments 4 to 8 and also in a small group posterior to vulva. Tubular ducts in lateral groups of 6–12 on segments 7 and 8. Trilocular pores not numerous, evenly distributed.

Mutabilicoccus simmondsi (Laing) ***comb. nov.***

(Text-figs. 11, 12)

Farinococcus simmondsi Laing, 1925, *Bull. ent. Res.*, **16** : 54.

HABIT. Described by Laing from NEW BRITAIN, Kokopo on coconut. Notes given by E. S. Brown show that the external appearance exhibits considerable variation ranging from greyish white with a darkish centre to a form covered with a yellow granular wax. There is some correlation between these extremes and the forms described below, as the former is a characteristic of the typical form and the yellow with the atypical form. Furthermore the specimens of the white form are often abundant in colonies whilst the specimens of the yellow form are more scattered and in a few cases were taken singly. The species has been collected from the Solomon Islands as follows:— GUADALCANAL: Kukum, coconut, tended by *Oecophylla smaragdina* and *Anoplolepis longipes* 20.vii.1954, 27.x.1955; Tenaru, coconut, tended by *Iridomyrmex myrmecodiae* 19.v.1955; Mamara, coconut, tended by *Iridomyrmex myrmecodiae* 29.x.1954, 6.vi.1956; Ilu, *Areca* sp., tended by *Iridomyrmex myrmecodiae* 1.vii.1956; Lunga, coconut, tended by *Pheidole megacephala* 18.vii.1956; SAN CRISTOBAL: Makua, coconut, tended by *Iridomyrmex myrmecodiae* 1.v.1955; NEW GEORGIA: Tusamine, on an unknown shrub, 30.ix.1954; KOLOMBANGARA: Kerikana, coconut, tended by *Oecophylla smaragdina* 2.x.1954; RUSSELL IS.: Pepesala, coconut, 5.ix.1955 and Fai Ami, 9.ix.1955 both tended by *Oecophylla smaragdina*; MALAITA: coconut, B. A. O'Connor 12.v.1950.

Specimens are also at hand from Tomalabatt Plantation, Tatau, NEW IRELAND collected by J. J. H. Szent-Ivany 13.vii.1955.

RECOGNITION CHARACTERS. Shape broadly oval measuring approximately 1·8 × 1·3 mm. Antennae 6-segmented, the third segment about as long as the fourth and fifth together. Legs normal, slender, of moderate length, posterior coxae with a few translucent pores. Circulus present. Ostioles with 2–3 setae and a few trilocular pores on each lip and with inner edges of lips sclerotized. Anal ring situated at

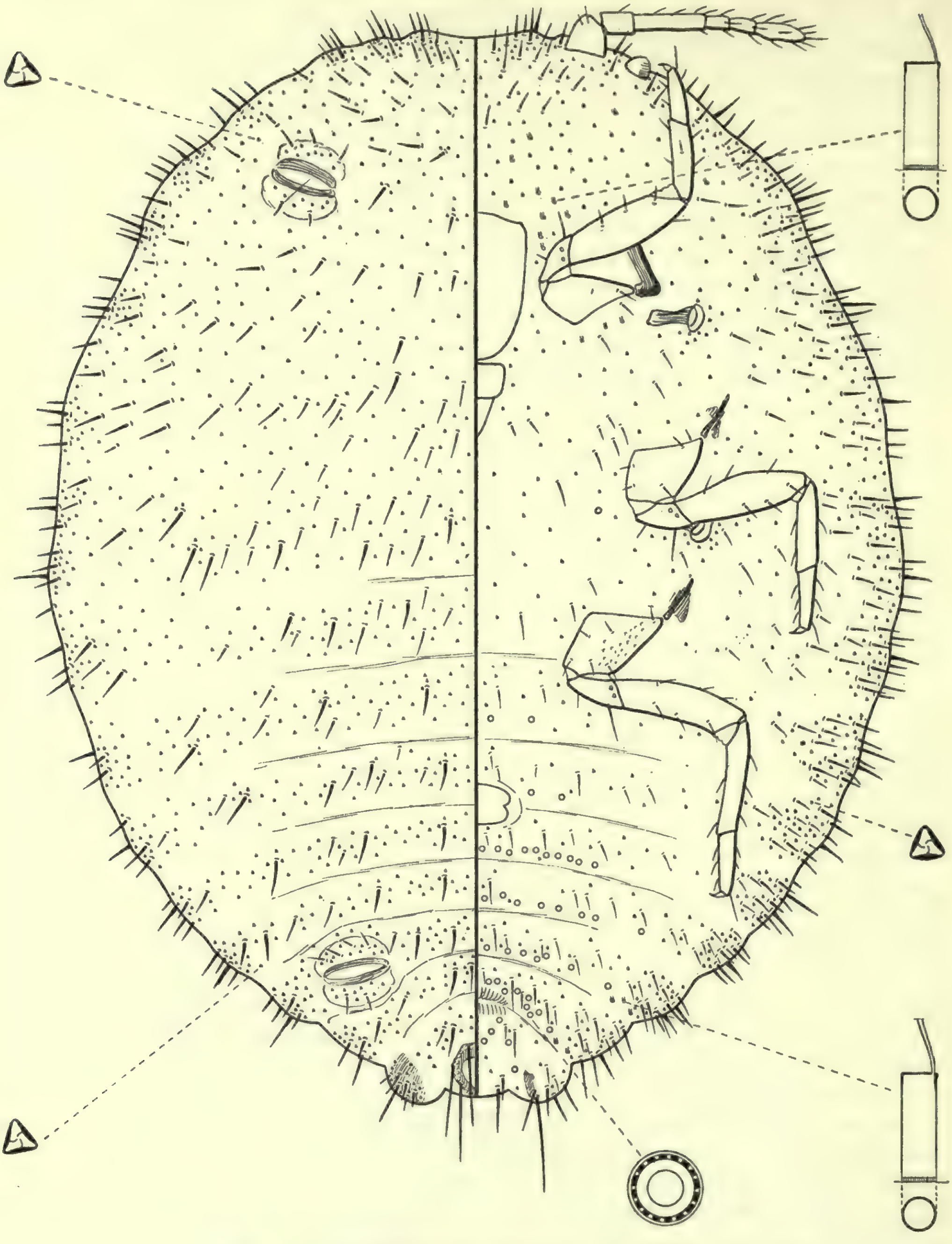

FIG. 11. *Mutabilicoccus simmondsi* (Laing). (Typical form)

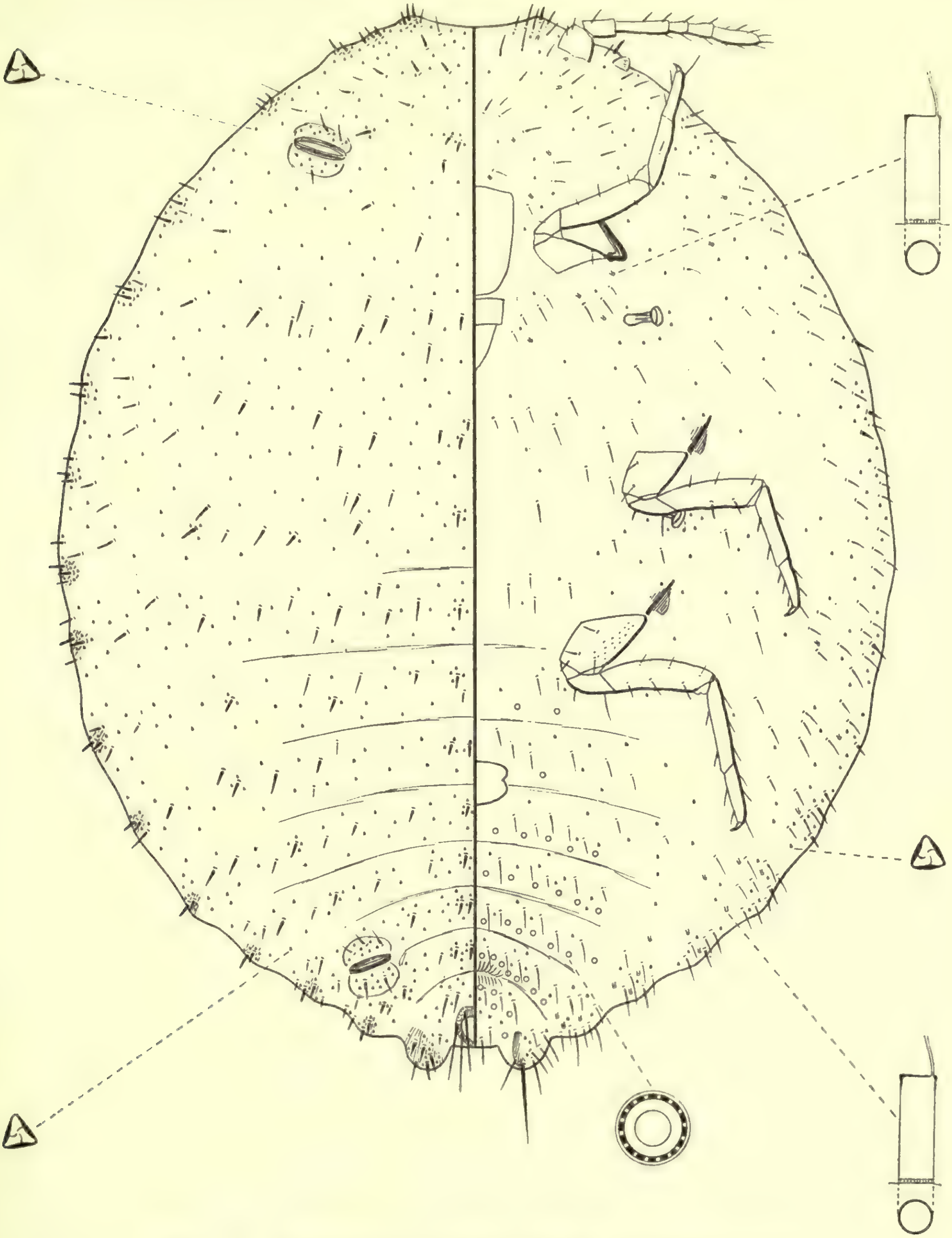

FIG. 12. *Mutabilicoccus simmondsi* (Laing). (Atypical form).

apex of body, with 6 setae which are twice the length of diameter of ring. In the typical form of this species (Text-fig. 11) dorsal setae of various sizes but mainly long and stout becoming more numerous laterally in the positions of the cerarii where with difficulty it is possible to distinguish 18 main groups with a concentration of trilocular pores at the bases. Other dorsal setae often with 2–3 trilocular pores at bases. In the atypical form of this species, (Text-fig. 12), the number and sizes of the dorsal setae are much reduced but again there is no difference in shape between setae occupying the normal positions of the cerarii to the other setae although the 18 pairs of groups are more easily discernible and the abdominal groups are surrounded by lightly sclerotized areas. Other forms of the species show many intermediate conditions, there being a complete range between one extreme and the other. In all cases there is a rather large area of sclerotization about the anal lobes.

Ventral surface with a distinct anal bar and bar seta and a pair of long, stout, apical setae. Ventral setae of various sizes, all slender in midregion but replaced laterally by longer or stouter setae similar to those on dorsal surface. In the typical form the latter setae are quite numerous around the margins but are much reduced in number and size in the atypical form. Multilocular disc pores in all forms rather constant being arranged in more or less single transverse rows on posterior edges of segments 3–8 and becoming more numerous posteriorly, a group also situated posterior to vulva. Tubular ducts of oral collar type in small marginal groups on posterior abdominal segments and also around anterior pair of coxae. Trilocular pores sparse.

NOTES. There is considerable variation in the size and distribution of setae in material at hand and were it not for intermediate forms the two specimens herein illustrated would be placed in different species. Where there is a decrease in the lengths of the setae there seems to be a corresponding decrease in number of setae but the overall pattern of the multilocular disc pores and other characters remains constant.

Neosimmondsia Laing

Neosimmondsia Laing, 1930, *Bull. ent. Res.* **21** : 19.

RECOGNITION CHARACTERS. Subcircular species of Pseudococcidae with 6-segmented antennae ; legs normal, claw without a denticle ; circulus rectangular ; anterior and posterior ostioles present ; anal ring lying about its own length from apex of body, cellular with 6 setae ; cerarii absent ; setae long and slender, as long as or longer than anal ring setae ; trilocular pores abundant ; multilocular disc pores on ventral surface numerous on abdomen and thorax ; tubular ducts on venter only.

NOTES. This genus bears a similarity to *Cryptoripersia* Cockerell and to *Mizococcus* Takahashi. In both these genera, however, there is a single pair of cerarii. The nearest genus is *Pilococcus* Takahashi described in 1928 with *P. miscanthi* as the only included species and differing to *Neosimmondsia* in having 8-segmented antennae instead of 6-segmented and in having multilocular disc pores on the abdomen only. Further study may show that *Neosimmondsia* should be synonymized with *Pilococcus*.

Neosimmondsia hirsuta Laing

(Text-fig 13)

Neosimmondsia hirsuta Laing, *Bull. ent. Res.* **21** : 19, 20.

HABIT. Laing described this species from MALAITA on coconut and it has since been collected only once by E. S. Brown at SAN CRISTOBAL, Santa Catalina on coconut, 23.iv.1955.

RECOGNITION CHARACTERS. A subcircular species with an approximate diameter of 2·3 mm., anal lobes poorly developed. Antennae 6-segmented. Legs normal but coxae rather long in comparison with remainder of limbs, posterior coxae with a few translucent pores. Circulus present, small and rectangular. Ostioles well developed, wide. Anal ring lying about its own length from apex of body, with 6 setae which are slightly longer than ring. Cerarii absent. Dorsal setae numerous, slender and mainly long, often as long as or longer than anal ring setae. Trilocular pores abundant.

Ventral surface with a long, stout pair of apical setae and a small, more or less triangular sclerotized area on the inner side of each anal lobe. Ventral setae all slender, of various sizes but mostly long. Multilocular disc pores numerous across midregions of segments posterior to circulus and also posterior to vulva, anterior to circulus they are numerous in the submedian areas particularly around the coxae. Tubular ducts few, there being small groups in the submargins of segments 7 and 8 and a few lateral to posterior coxae and also posterior spiracles. Trilocular pores numerous.

Palmicola gen. n.

Type of genus *Ripersia palmarum* Ehrhorn.

RECOGNITION CHARACTERS. Oval or broadly oval species of Pseudococcidae with posterior end of body rounded, anal lobes poorly developed; antennae 6–7-segmented; cerarii numbering 14–17 pairs each with up to 7 conical setae of various sizes or with but 2 setae of same size, accompanied by 1 or 2 auxiliary setae; legs normal, claw without a denticle, posterior coxae with a few minute ducts which are extended to the surrounding areas of the derm; circulus present, rather small in the known species; anterior and posterior ostioles present; multilocular disc pores present or absent on dorsum, always present on venter from apex of abdomen to head; ventral tubular ducts with oral collar on abdomen only, anal ring at apex of body, cellular with 6 setae.

NOTES. The distinctive features of this genus are the minute ducts surrounding the posterior coxae, a character which is shared with *Pseudantonina* Green but the latter seems to be far removed from *Palmicola* in possessing quite large posterior coxae, at most only 2 pairs of cerarii, and having minute legs and antennae.

The two species *Pseudococcus oceanicus* Takahashi and *Ps. oceanicus* var. *kentiae* Takahashi seem to belong to the genus but these have not been seen by the writer. Two other species still known under the genus *Pseudococcus* as *Ps. cocotis* Mask.

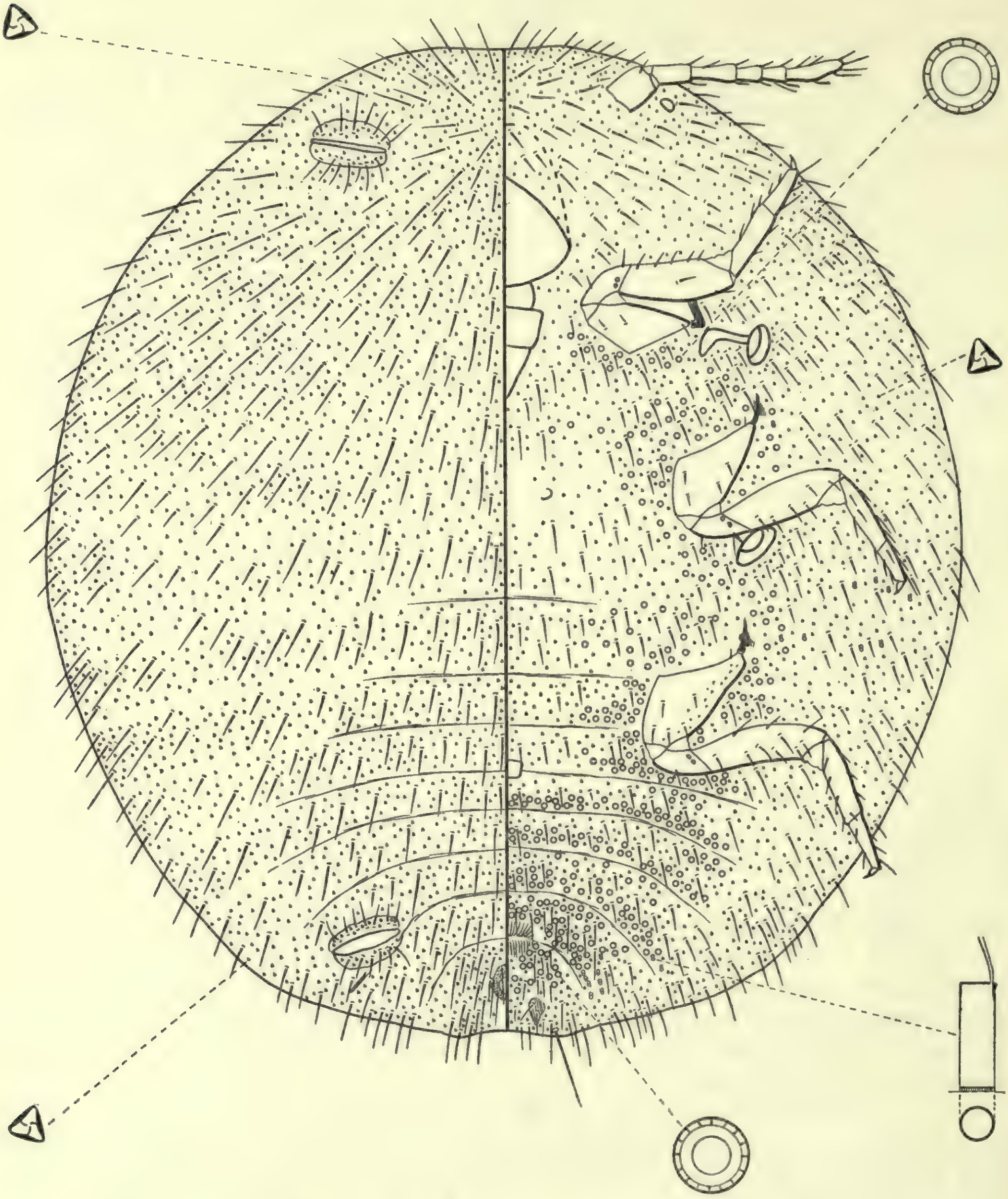

FIG. 13. *Neosimmondsia hirsuta* Laing

and *Ps. saipanensis* Shiraiwa seem to come close to the species of *Palmicola* but are excluded for the time being because they lack the minute ducts around the posterior coxae.

The genus seems to be confined to the plant family Palmaceae and will probably be found throughout the Pacific. Specimens of *P. palmarum* (Ehrh.) are at hand from Sepang in Malaya and it is possible that this or related species may be found in Indonesia and the Philippine Islands.

The new species may be separated from the type by the following key :—

Antennae normally 6-segmented, cerarii numbering 14–15 pairs, each cerarius with up to 6 or more setae . . . . *palmarum* (Ehrhorn)
Antennae 6–8-segmented, cerarii numbering 17 pairs each with 2 setae or sometimes with 3 in the head region . . . . *browni* sp. n

Palmicola browni sp. n.

(Text-fig. 14)

HABIT. A white powdery mealybug taken from various parts of coconut trees but especially on the terminal bud, the bases of young leaves and unopened spadix sheaths. It has been collected from the following localities :— GUADALCANAL : Kukum, 12.viii.1948, B. A. O'Connor, same locality tended by *Anoplolepis longipes*, E. S. Brown, 20.vii.1954, (holotype) ; Lunga, 18.vii.1956 tended by *Pheidole megacephala* ; BOUGAINVILLE : Numa-Numa, 1.vi.1956 ; RENNELL : Lavanggu, 23.xi.1955 ; RUSSELL Is.: Butete, 5.ix.1955 ; SAN CRISTOBAL : Boroni and Waimarai, 14.x.1955, associated with *Pheidole megacephala*.

Specimens are also at hand collected by J. L. Froggatt in 1937 from NEW BRITAIN (without locality) and ADMIRALTY Is., Manus.

RECOGNITION CHARACTERS. Length approximately 2·6 mm. Shape broadly elliptical, anal lobes moderately developed, posterior margin rounded. Antennae 6–8-segmented, the fusion of the segments in the 6-segmented condition taking place in the third and terminal segments. Legs normal, slender, posterior coxae with a few minute tubular pores, these pores also extending to the surrounding membranous areas anterior and posterior to junction of coxae and ventral derm. Circulus present, shape varying from subcircular to quadrate and lying between fourth and fifth segments. Ostioles with narrow lips and a few trilocular pores, rarely with setae but inner edges of lips sclerotized. Anal ring with 6 setae, these about twice as long as its diameter. Cerarii numbering 17 pairs each consisting of a pair of short stout conical setae usually of same size but often of different sizes, anterior cerarius often with three conical setae, all cerarii with small clusters of trilocular pores. Dorsal setae of moderate length, all slender. Multilocular disc pores sparse, being confined to anterior abdominal segments, thorax and head lying at anterior and posterior edges of segments. Trilocular pores not numerous.

Ventral surface with a pair of long apical setae. Other ventral setae slender and similar to those on dorsum. Multilocular disc pores present in all regions, in no definite arrangement on head and thorax but on abdomen they lie in transverse rows at anterior and posterior edges of segments. Tubular ducts small and sparse, on

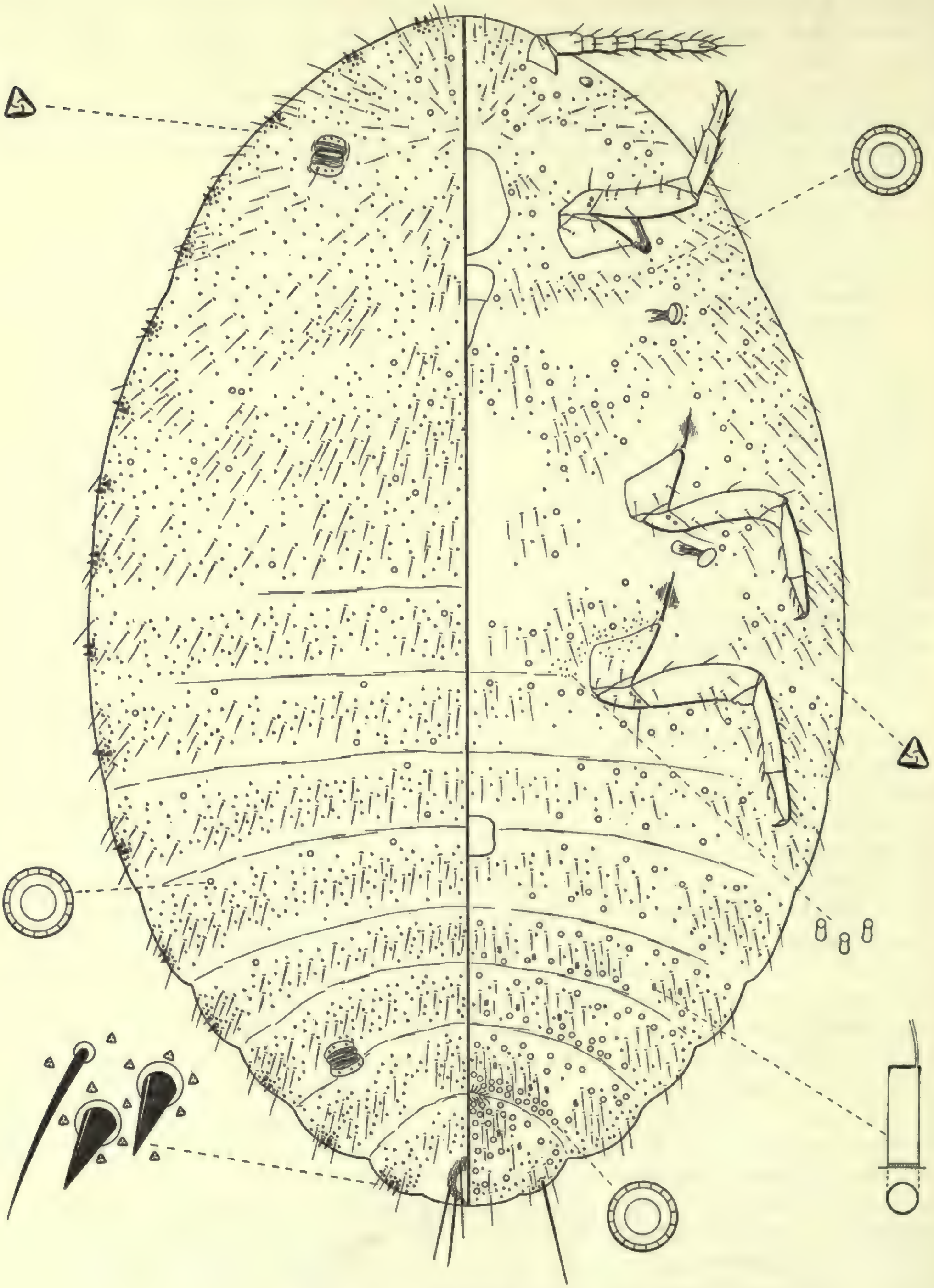

FIG. 14. *Palmicola browni* sp. n.

the sixth and posterior segments only, lying in single transverse rows. Trilocular pores evenly distributed.

Paraputo Laing

Paraputo Laing, 1929, *Ann. Mag. nat. Hist.* (10) **4** : 473.

Type of genus *Paraputo ritchei* Laing = *Ripersia anomala* Newstead.

RECOGNITION CHARACTERS. Pseudococcidae with broadly oval body, anal lobes either protruding or poorly developed, antennae 6-segmented ; legs usually rather short and stout, claw without a denticle ; anterior and posterior ostioles well developed ; circulus usually well developed ; anal ring lying on dorsal surface at a distance of one to two times its diameter from apex of body, cellular with 6 setae ; cerarii numbering up to 18 distinct pairs or reduced in number to the posterior abdominal segments or joined on entire margin forming a more or less continuous row, when distinct each cerarius composed of numerous conical setae ; dorsal setae usually short although in one species they are nearly as long as anal ring setae, always rather abundant ; trilocular pores quite numerous on dorsum and venter ; multilocular disc pores on venter only ; tubular ducts confined to ventral abdominal areas either sparse or numerous but always in large or small groups on submargins of posterior segments. With or without a small area of sclerotization on ventral anal lobes.

NOTES. This genus has been redefined after a recent study of the type species (Williams 1958). The two following species are referred to the genus in possessing 6-segmented antennae although one of them is known with 7-segmented antennae. Ferris (1955) redescribed the genus from immature specimens and if he had had available some adult females it is doubtful whether he would have erected the genus *Cataenococcus* as this differs only in possessing 8-segmented antennae. As other species are known with 7 segments it seems reasonable to assume that *Cataenococcus* will be reduced to a synonym of *Paraputo*.

The two Solomon Islands species and the type from Africa may be separated by the following key :—

1. Cerarii reduced in number to 11–13 pairs, being missing on the thorax, anal lobes protruding, with distinct ventral clusters of tubular ducts on the submargins of segments 7 and 8 . . . . *anomala* (Newstead)

– Cerarii complete around the margins as 18 distinct pairs or forming a more or less continuous row 2

2. Cerarii numbering 18 distinct pairs, dorsal setae about same length as cerarian setae without an area of sclerotization on anal lobes . . . . . . *leveri* (Green)

– Cerarii numbering 18 pairs but these often connected by conical setae, dorsal setae and auxiliary setae nearly as long as anal ring setae, ventral surface of anal lobes with a distinct area of sclerotization . . . . . *kukumi* sp. n.

Paraputo kukumi sp. n.

(Text-fig. 15)

HABIT. Taken from the aerial roots of coconut, GUADALCANAL, Kukum, 14.viii. 1948, B. A. O'Connor. External appearance not known.

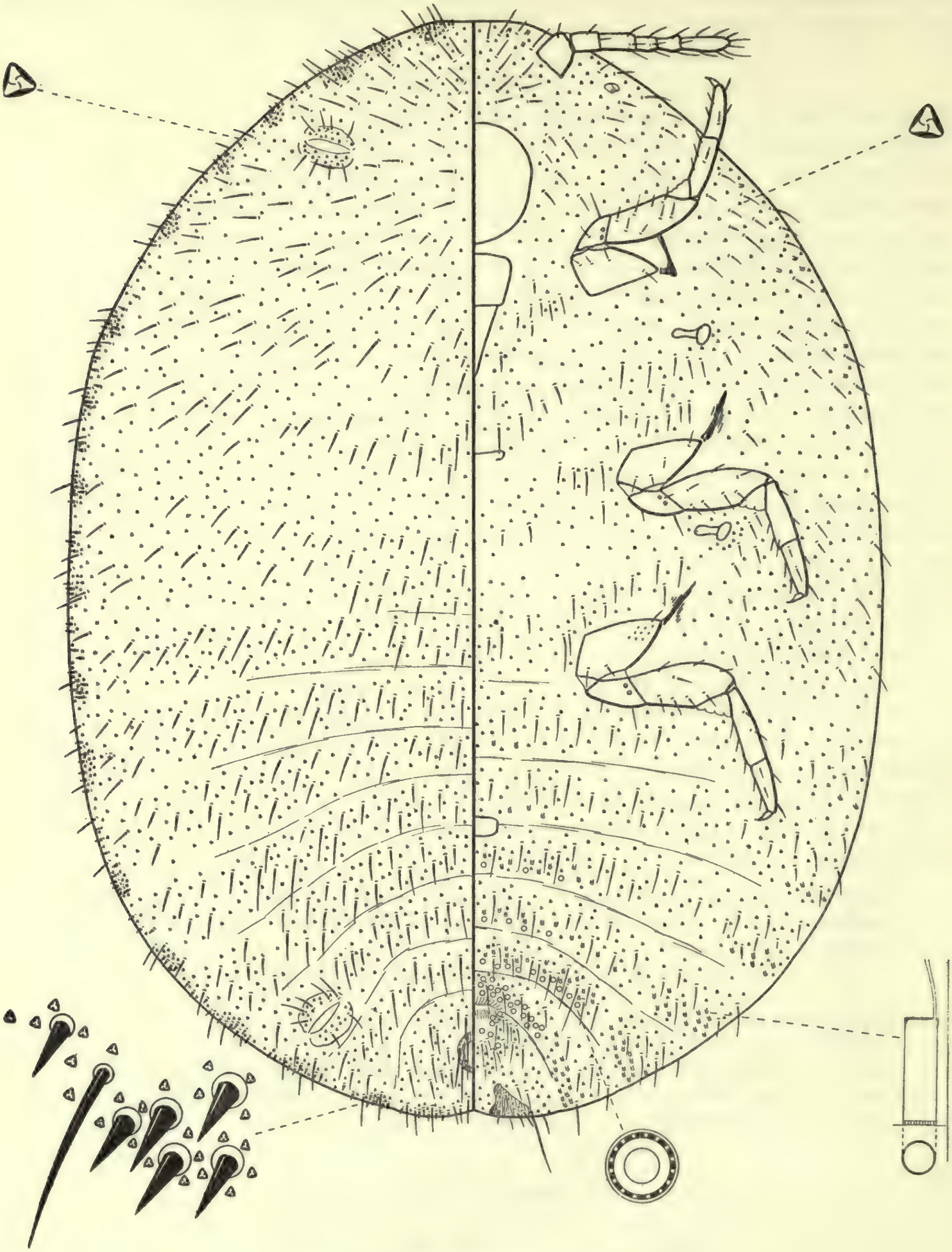

FIG. 15. *Paraputo kukumi* sp. n.

RECOGNITION CHARACTERS. A broadly oval species attaining a length of 2·0 mm., older specimens becoming more rotund, anal lobes poorly developed. Antennae 6-segmented. Legs short and stout, posterior coxae with a few translucent dots. Circulus present, in specimens available it is distorted but apparently it is rather small. Ostioles moderately developed, lips with a few setae and trilocular pores. Anal ring situated about its own length from apex of body, with 6 setae, these slightly longer than diameter of ring. Cerarii present in a more or less continuous row around margin although it is possible to define 18 groups of setae which are connected by other cerarian setae. Cerarian setae small and conical, numerous and with long auxiliary setae which do not appear to be constant in number or position. In the three specimens available many of the cerarian setae are missing so that the accompanying diagram must be regarded as tentative although the cerarian setae have been drawn from the pattern of the setal bases. Dorsal setae mainly long and slender, many approaching size of anal ring setae. Trilocular pores somewhat numerous.

Ventral surface with a noticeable triangular sclerotized area on each anal lobe containing a few setae and trilocular pores. Setae slender, varying in size but mainly similar to those on dorsum. Multilocular disc pores on all segments posterior to circulus, fifth and sixth segments with 4–7, seventh segment with 13–16, eighth with about 30 pores, there being also a group of about 9–12 posterior to vulva. Tubular ducts of oral collar type confined to abdomen in midregion in transverse rows and in lateral groups on third to seventh segments and also in lateral groups on eighth segment, becoming more numerous posteriorly. Trilocular pores numerous and evenly distributed.

NOTES. This species has been described from three specimens which are not in perfect condition. The more or less continuous row of cerarian setae and the long dorsal setae serve to distinguish the species.

Paraputo leveri (Green) (***comb. nov.***)

(Text-fig 16)

Pseudococcus leveri Green, 1934, *Ann. Mag. nat. Hist.* (X) **13** : 473, 474.

HABIT. A mealybug covered with white wax and usually associated with ants, described originally without locality from the Solomon Islands on coconut. It also feeds on other hosts and specimens are at hand from Fiji on *Bischoffia javanica* collected by B. A. O'Connor 23.xi.1957. GUADALCANAL: Kukum, coconut, 14.viii.1948, B. A. O'Connor, aerial roots of coconut with *Iridomyrmex myrmecodiae*, 4.x.1956, E. S. Brown; Tenaru, coconut roots tended by *Pheidole umbonata* 31.vii.1954, with *Iridomyrmex myrmecodiae*, 5.viii.1954, *Ficus septica* tended by *Iridomyrmex myrmecodiae* 24.iv.1956; Rua Vatu, coconut roots associated with *Ireneidris myops*, 25.x.1956, *Ficus* sp. roots tended by *Technomyrmex detorquens*, 19.xi.1954. MALAITA: Baunani, coconut roots tended by *Ireneidris myops*, 10.xi.1954. RENDOVA: *Ficus* sp. tended by *Technomyrmex detorquens* 8.x.1954. SAN CRISTOBAL: Ugi, Three Sisters, Boroni and Waimamura, all on coconut tended

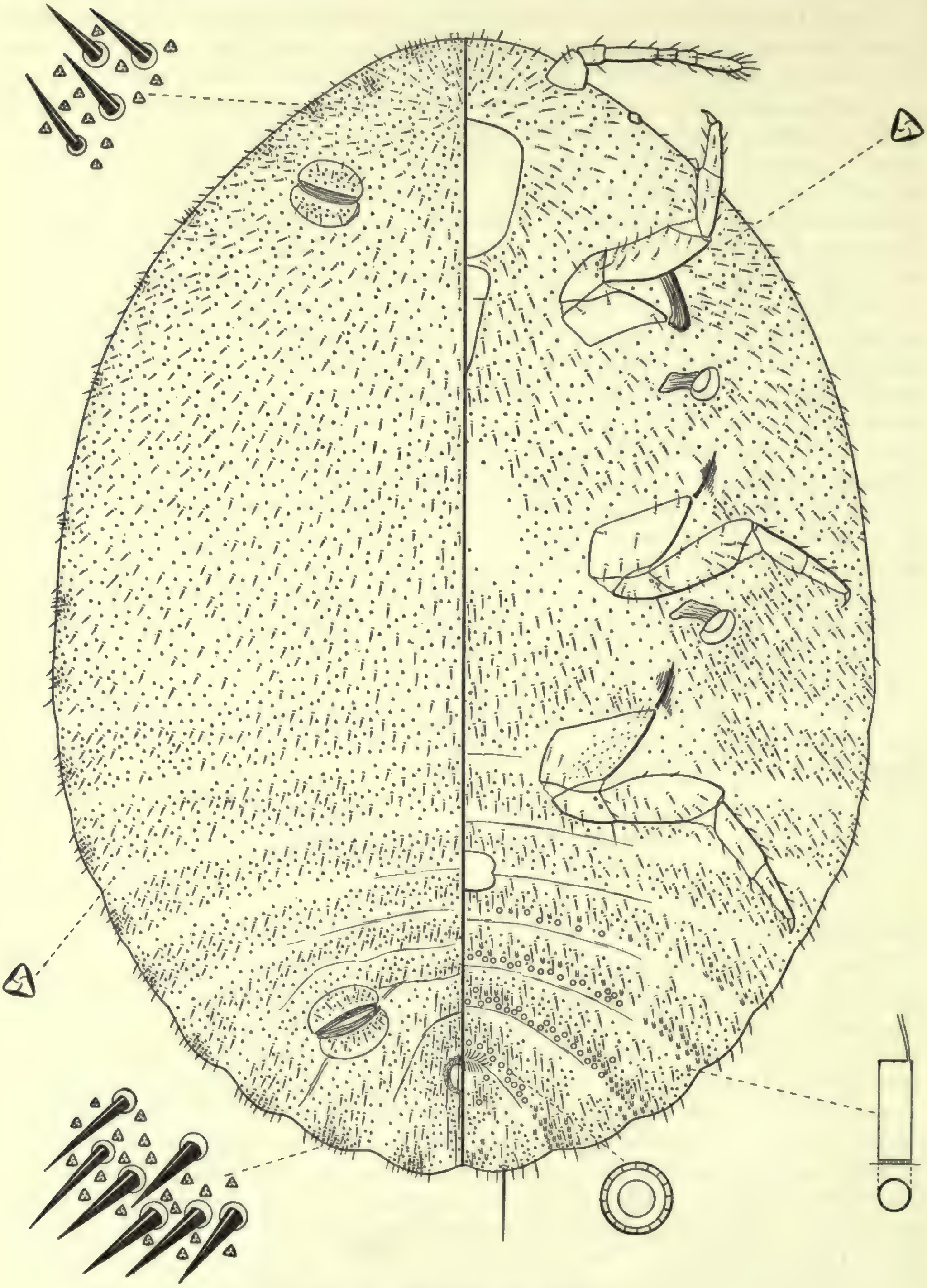

FIG. 16. *Paraputo leveri* (Green).

by *Pheidole megacephala*; Waimamura, *Inocarpus edulis* tended by *Oecophylla smaragdina*, all April 1955; Kira Kira, *Ficus* sp. with *Iridomyrmex myrmecodiae* 20.viii.1956. RUSSELL IS.: Fai Ami, coconut roots, 9.xi.1955. NGELLA: Votilau, coconut roots, 10.xi.1956.

RECOGNITION CHARACTERS. Young adult females elongate oval, sides subparallel, older adults more rounded, attaining a length of 3·8 mm. Antennae 6–7-segmented. Legs short and stout, posterior coxae with translucent pores. Circulus rather large. Ostioles well developed with numerous setae and trilocular pores, inner edges of lips sclerotized. Anal ring situated about twice its length from apex of body, with 6 setae, slightly longer than diameter of ring. Cerarii numbering 18 pairs, small on thorax, each comprising 3–4 conical setae but large on head and abdomen, anal lobe and penultimate cerarii each with up to 12 conical setae and numerous trilocular pores. Dorsal surface with numerous short setae, these slightly longer but more slender than cerarian setae. Trilocular pores abundant.

Ventral surface with numerous slender setae tending to be longer than those on dorsum. Multilocular disc pores on all segments posterior to the circulus, in more or less single transverse rows at posterior edges of segments and in a small cluster of 4–5 posterior to vulva. Small tubular ducts in groups of up to 15 between anal lobes and near posterior lateral margins as far as fifth segment, fifth to seventh segments also with single transverse rows in midregion. Trilocular pores numerous.

Pedrococcus Mamet

Pedrococcus Mamet, 1942, *Proc. R. ent. Soc. Lond.* B, **11**: 79.

Mamet erected this genus for four species from Mauritius with *Pedronia greeni* Mamet as type. Since then another two have been added all from the Malagasian area. According to Mamet it differs from *Pedronia* in having the dorsal conical setae on small sclerotized areas and with one or two trilocular pores at the bases.

The genus *Pedronia* Green has been redescribed by Mamet (1942) from specimens of *P. strobilanthis* Green the type species. It has been shown that none of the setae or cerarii is situated on sclerotized areas but in specimens at hand some of the dorsal setae have one or two trilocular pores at the bases. Another species *P. strobilanthis tenuispina* Green seems to be referable to *Pedrococcus* because from the single specimen at hand the lateral and dorsal setae are situated on sclerotized areas. A revision of the whole group is needed to clarify the position.

Pedrococcus tinahulanus sp. n.

(Text-fig. 17)

HABIT. Collected from a small tree in the carton shelters made by *Iridomyrmex myrmecodiae* on the underside of the leaves. GUADALCANAL: Tinahula River, 22.iii.1955.

RECOGNITION CHARACTERS. Shape of adult female broadly oval measuring approximately 1·8 mm. long. Antennae 7-segmented. Legs normal, the posterior

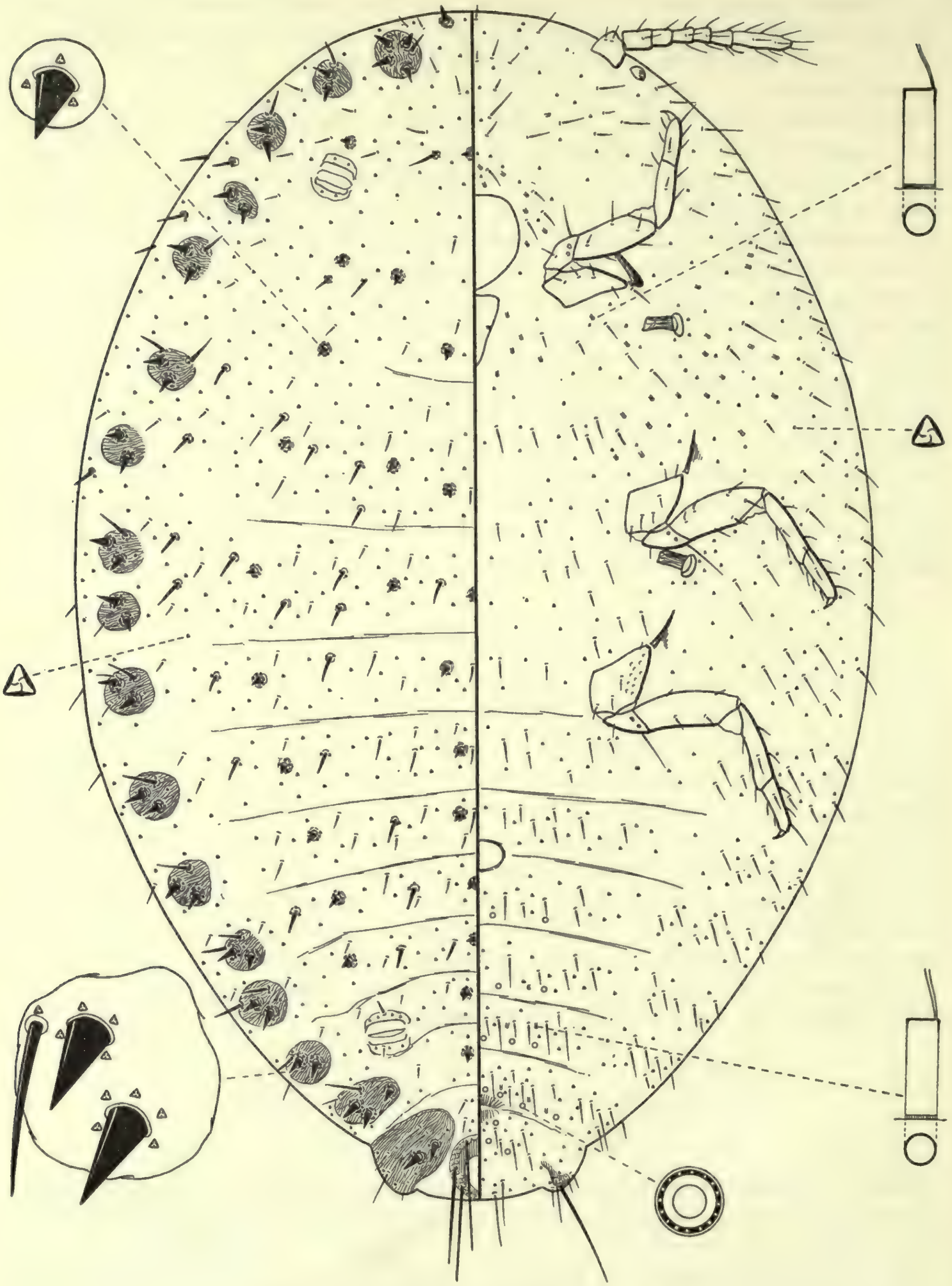

FIG. 17. *Pedrococcus tinahulanus* sp. n.

coxae with a few translucent pores. Circulus present, round and rather small. Ostioles with narrow membranous lips containing two or three trilocular pores and an occasional seta, inner edges of lips sclerotized. Anal ring with 6 setae these about twice as long as diameter of ring. Cerarii numbering 17 pairs each borne on a sclerotized plate. Anal lobe cerarius with 2 stout conical setae, with a few trilocular pores and accompanied by a few slender setae on a sclerotized plate which is about twice the size of anal ring. Anterior cerarii each with a pair of stout conical setae except the anteriormost which has up to four, the cerarian setae about 2–3 times as long as diameter at base and accompanied usually by one or two long, stout setae. Trilocular pores in the cerarii arranged mainly around bases of setae. Dorsal setae of various sizes, there being a few small conical setae arranged in transverse rows each about 1½–2 times as long as basal diameter and with about three trilocular pores at base surrounded by a lightly sclerotized circular area. Longer setae but of smaller diameter interspersed with the small conical setae and each with one or two trilocular pores at base, other setae present small and slender. Trilocular pores sparse.

Ventral surface with a long, stout pair of apical setae each attached to a small sclerotized anal bar. Ventral setae of different sizes but all slender. Multilocular disc pores in single transverse rows in midregion of segments posterior to circulus, not numerous, at most there being about 40 altogether. Tubular ducts present in small numbers of 2–4 in midregion of segments 6–8 and also more numerous in groups between first pair of coxae and between first and second pairs of coxae. Trilocular pores sparse.

NOTES. This species comes closest to *Pedrococcus longisetosus* Mamet described from Mauritius but differs in having the dorsal conical setae shorter in relation to the marginal conical setae. The slender dorsal setae in *P. tinahulanus* are also shorter than those of *P. longisetosus*.

Planococcus Ferris

Planococcus Ferris, 1950, *Atlas of Scale Insects of North America*, **5** : 164.

Only one species has so far been collected in the Solomon Islands and this is a cosmopolitan species. Species are at hand from New Guinea from genera related to *Planococcus* and it is possible that these or similar species may yet be found in the Solomon Islands.

Planococcus citri (Risso)

Dorthesia citri Risso, 1813, *Ann. Mus. Hist. nat. Paris*, **30** : 416–418.
Planococcus citri (Risso), Ferris, 1950, *Atlas of Scale Insects of North America*, **5** : 165.
Planococcus citri (Risso), Ezzatt & McConnell, *Univ. Maryland Agric. Exp. Sta. Bull.* A-**84** : 65.

GUADALCANAL : Honiara, Tomato, B. A. O'Connor, 9.viii.1948 ; Kukum, *Tephrosia* sp., E. S. Brown, 28.vii.1954, custard apple tended by *Technomyrmex detorquens*, 19.i.1955 ; Tenaru, *Senecio* sp. with *Iridomyrmex myrmecodiae*, 5.viii. 1954, *Mimosa pudica*, 29.vi.1954 and *Macaranga* sp. tended by *Anoplolepis longipes*, 18.xi.1954. RUSSELL IS.: Banoka, Tomatoes, B. A. O'Connor, July 1933; Fai Ami, *Sonneratia* sp., E. S. Brown, 9.xi.1955; Yandina, *Theobroma cacao*, 12.v.1955. MALAITA: Auki, *Theobroma cacao* with *Technomyrmex detorquens*, 4.ix.1954; Rongofano, 28.v.1955. SAN CRISTOBAL: Kira Kira, *Theobroma cacao*, 20.vii.1956; Three Sisters, Malaupaino, *Cocos nucifera*, B. A. O'Connor, 13.v.1934. SANTA YSABEL: Holokama, *Theobroma cacao* tended by *Technomyrmex detorquens* and *Oecophylla smaragdina* 17.ii.1956; Huhurangi, *Theobroma cacao* tended by *Anoplolepis longipes*, 18.ii.1956. BOUGAINVILLE: Buka, *Theobroma cacao* with *Technomyrmex detorquens*, 29.v.1956; Kieta, *Coffea* sp. J. L. Froggatt, 19.ix.1937, 17.viii.1938. NEW GEORGIA: Arundel, *Morinda citrifolia* tended by *Anoplolepis longipes*, 4.x.1954. RENNELL: Nanggan, a legume tended by *Iridomyrmex myrmecodiae*, 24.xi.1955. NGELLA: Tulazi, *Annona muricata*, R. A. Lever, 28.vii.1934.

Pseudococcus Westwood

Pseudococcus Westwood, 1840, *Intr. Mod. Class. Ins. Syn. Br. Ins.* **2**: 118.
Pseudococcus Westwood, Ferris, 1950, *Atlas of Scale Insects of North America*, **5**: 170.

Ferris erected the genus *Dysmicoccus* to cater for those species which were similar to *Pseudococcus* but without oral rim ducts. Some of the *Pseudococcus* species known throughout the Pacific area have a reduced number of oral rim ducts and at times reduced to a single duct only. Whether the presence or absence of oral rim ducts is sufficient for generic separation can only be found after further species have been studied. The two species from the Solomon Islands can be identified from the following key:—

With, at most, a single oral rim duct behind each of the first and tenth cerarii	*solomonensis* sp. n.
With usually 3 oral rim ducts of different sizes near most cerarii .	*adonidum* (Linnaeus)

Pseudococcus adonidum (Linnaeus)

Coccus adonidum Linnaeus, 1766, *Syst. Nat.*, Ed. 12, **1**: 740.
Pseudococcus adonidum (Linnaeus), Ferris, *Atlas of Scale Insects of North America*, **5**: 174.

Taken on one occasion only at GUADALCANAL, Kukum, Kokumbona River, on *Ficus septica* tended by *Iridomyrmex myrmecodiae*.

Pseudococcus solomonensis sp. n.

(Text-fig. 18)

HABIT. Taken from the fruits of *Theobroma cacao* where the ants, *Technomyrmex detorquens*, had built carton shelters over them, the colonies situated mainly down the length of the fruit in the grooves, SANTA YSABEL, Holokama, 21.ii.1956. Tended also by the same ant in the axis of a bunch of fruit of wild banana, MALAITA, Rongofano, 28.v.1955.

RECOGNITION CHARACTERS. Body broadly oval attaining a length of 3·5 mm. Antennae 8-segmented. Legs normal, posterior pair with numerous translucent

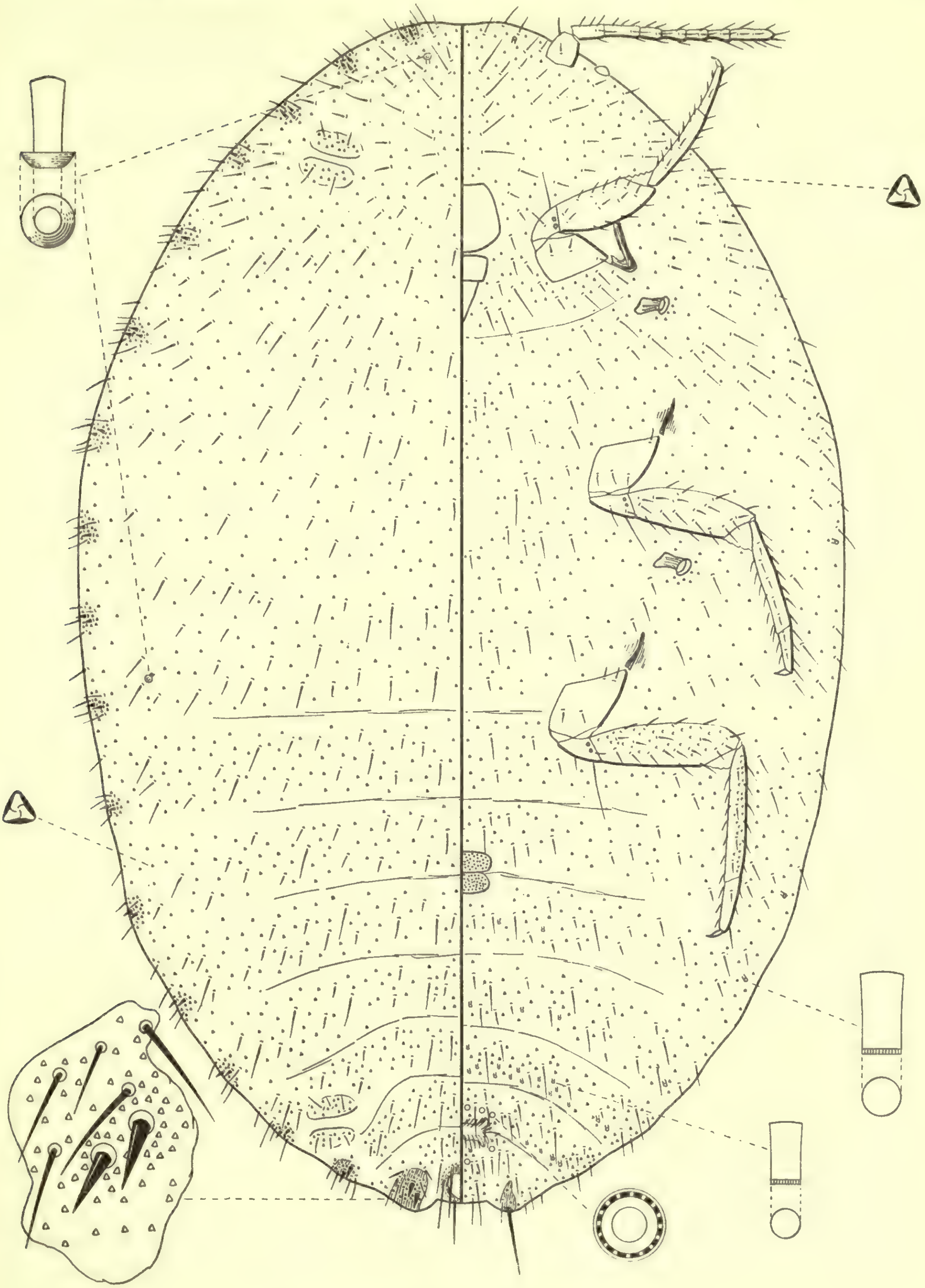

FIG. 18. *Pseudococcus solomonensis* sp. n.

pores on each femur and tibia. Circulus well developed. Ostioles with 2–3 small setae and a few trilocular pores on each lip. Anal ring with 6 setae which are nearly twice as long as diameter of ring. Vulva of an indefinite shape with internal folds. Cerarii numbering 17 pairs; anal lobe cerarii each with a pair of stout conical setae accompanied by a cluster of trilocular pores and about 6 slender setae, surrounded by a sclerotized area about same size as anal ring. Anterior cerarii each composed of 2 conical setae except some of anterior cerarii which have 3, each surrounded by a group of trilocular pores and 3–5 auxiliary setae. Dorsal setae not numerous, of various sizes but all slender. Tubular ducts of oral rim type, at most represented by 2 pairs, an anterior pair behind the first cerarii and another pair next to the tenth cerarii, one pair of these often missing or missing on one side of the body only, occasionally absent entirely. Trilocular pores evenly distributed.

Ventral surface of body with a wide curved sclerotized area on anal lobes. Apical setae long and stout. Ventral setae slender and not numerous. Multilocular disc pores situated about the vulva only, there being scarcely more than about 15 altogether. Tubular ducts of oral collar type of two sizes, a small type situated in midregion of segments posterior to circulus, these sparse in transverse rows except on seventh segment where they are more numerous. A larger type situated around margins, there being usually a pair on the seventh and eighth segments and singly on some of the other segments. Trilocular pores sparse.

NOTES. The species belongs to a group known from the Pacific area with a reduction in number of oral rim ducts and multilocular disc pores and also possessing a vulva with a sclerotized folding similar to that of *Pseudococcus floriger* Ferris.

Trionymus Berg

Trionymus Berg, 1899, *Comun. Mus. nac. B. Aires*, **1** : 78.
Trionymus Berg, Ferris, 1950, 1953, *Atlas of Scale Insects of North America*, **5** : 251, **6** : 482.

This genus usually occurs on grasses and some other monocotyledons but there are a few exceptions including the following species which has been collected from *Ficus copiosa*. In the Solomon Islands *Ficus* often seems to be an alternative host to those species which normally feed on coconut. According to E. S. Brown these are not chance records due to proximity because many of the collections from *Ficus* were made at great distances from the nearest coconut trees. It seems possible that the following species may yet be found on coconut, a more natural host.

Trionymus chalepus sp. n.

(Text-fig. 19)

HABIT. Collected on *Ficus copiosa* and tended by *Iridomyrmex myrmecodiae* which stroke them with the antennae, GUADALCANAL, Tenaru, 5.viii.1954.

RECOGNITION CHARACTERS. A small oval species measuring approximately 3·2 × 2·0 mm. Antennae 8-segmented. Legs short and slender, the posterior coxae with a few translucent pores. Circulus small and round. Ostioles present with

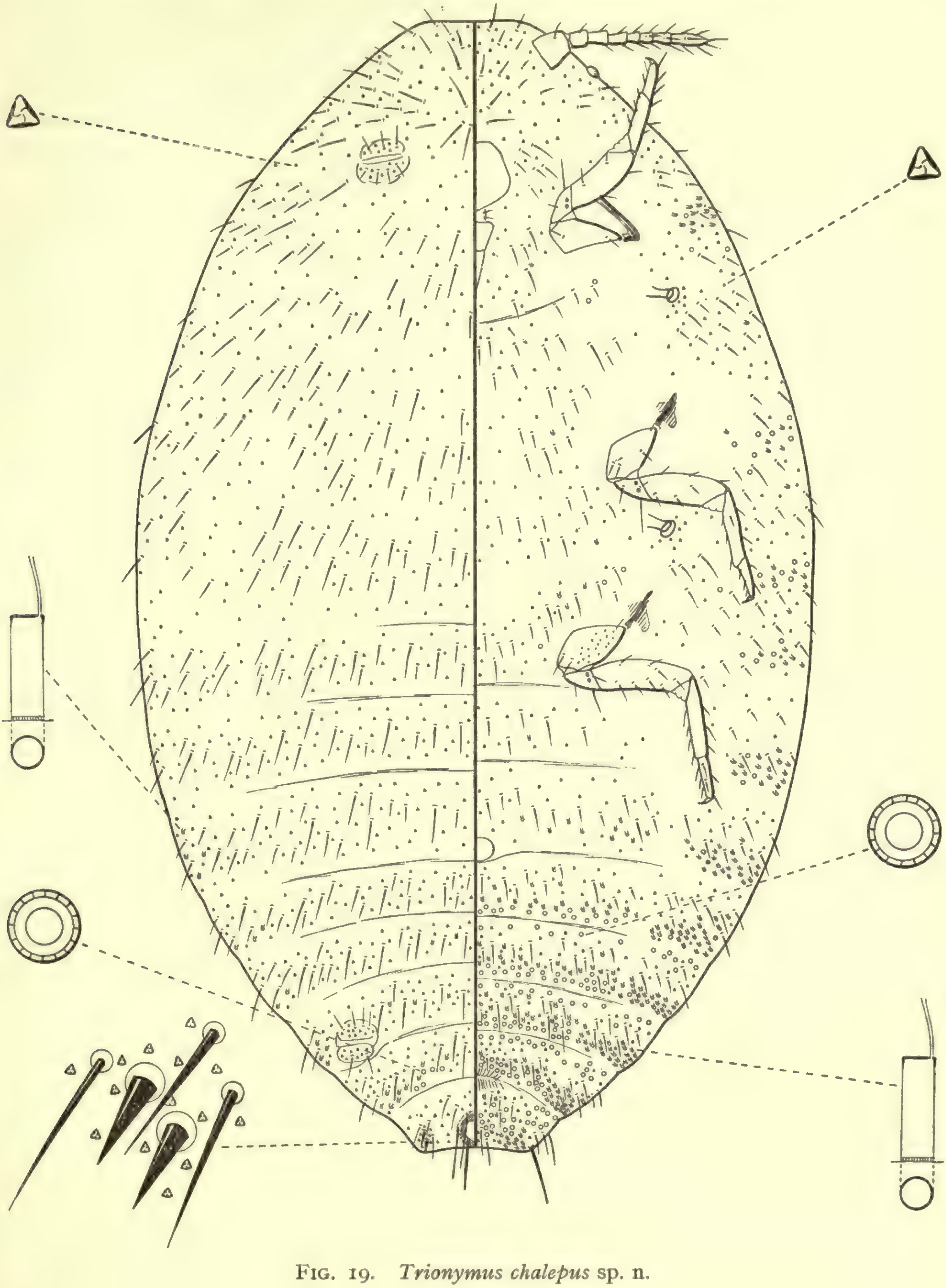

FIG. 19. *Trionymus chalepus* sp. n.

3–4 setae and a few trilocular pores on each lip. Anal ring with 6 setae nearly twice as long as its diameter. Cerarii represented by a pair on anal lobes only, each with 2 short, conical setae, a few trilocular pores and 3 auxiliary setae. Dorsal setae rather long and slender. Multilocular disc pores numbering about 10 in a single row at posterior edge of eighth segment only. Tubular ducts small, arranged in small groups of 2–4 on margins of fourth to eighth segments and a few in midregions of segments 6–8. Trilocular pores few, evenly distributed.

Ventral surface with apical setae only slightly larger than anal ring setae. Setae not numerous, all slender and tending to be shorter than those on dorsal surface. Multilocular disc pores abundant on abdomen posterior to circulus, arranged more or less in double transverse rows at posterior edges of segments 6–8 ; groups of up to 7 situated on margins as far as prothorax, other occasional pores present near coxae. Small tubular ducts, numerous, in transverse rows on fourth and posterior segments and also in marginal groups anterior to prothorax, a few also present in mid-thoracic region. Trilocular pores evenly but sparsely distributed.

NOTES. This species has been described from three specimens only. In the distribution of the multilocular disc pores and ventral tubular ducts, it comes close to *Trionymus festucae* (Kuwana) but differs in possessing a larger circulus and fewer tubular ducts on the dorsum. The tubular ducts in *T. festucae* are very short whereas in *T. chalepus* they are of more normal length.

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